DOCUMENT RESUME

ED 176 856 PS 010 743

AUTHOR Silverman, Charles, Ed.
TITLE The High/Scope Report. Number Four.
INSTITUTION High/Scope Educational Research Foundation, Ypsilanti, Mich.
PUB DATE 79
NOTE 55p.

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Academic Achievement; Cognitive Style; Computer Assisted Instruction; *Early Childhood Education; Financial Policy; Global Approach; Measurement; Models; *Parent Child Relationship; *Preschool Children; Preschool Programs; *Public Education; *Writing Skills
IDENTIFIERS Kant (Immanuel); Piaget (Jean)

ABSTRACT

This report provides articles on several topics related to the education of young children. In the introduction High/Scope President David P. Weikart suggests that public investment in preschool education is a wise and economically sound social policy. New studies of the long term effects of preschool are demonstrating the staying power of early education experiences that took place almost 20 years ago. William Fabricius places Immanuel Kant's conclusions about reality and knowledge in the context of Enlightenment and Romantic philosophy, and explores some parallels and divergencies between Kantian and Piagetian theories. Robert Halpern discusses economic issues pertinent to international policy for preschool programs. James T. Bond, Lynne Tamor and Robert D. Matz discuss High/Scope research on a range of measures of children's writing abilities. Robert L. Egbert and Margaret E.G. Brisch argue that early childhood programs derived from a single pedagogical perspective are more likely to produce coherent and consistent results than the eclectic approaches that until recently have marked the field. Bernard Banet envisions increased uses in education for tiny, inexpensive computers and related electronic devices. Ann S. Epstein and Judith Evans discuss results of High/Scope longitudinal research which indicate positive and negative dimensions of parent-child interaction which predict children's scholastic performance. Their findings point to the conclusion that the mother-child relationship both influences and is influenced by children's early learning styles. (Author/RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

The High/Scope Report

ED176856

U S DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

PS 010743

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Nancy H. Brussolo
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

UN Declaration of the Rights Of The Child

THE RIGHT

to affection, love, and understanding.
to adequate nutrition and medical care.
to free education.
to full opportunity for play and recreation.
to a name and nationality.
to special care, if handicapped.
to be among the first to receive relief in times of disaster.
to learn to be a useful member of society and to develop individual abilities.
to be brought up in a spirit of peace and universal brotherhood.
to enjoy these rights, regardless of race, color, sex, religion, national, or social origin.

International Year of the Child

The United Nations invites you to renew your concern for children everywhere . . .

The **High/Scope Report** Number Four

Board of Directors

William F. Dannemiller
Attorney, Ypsilanti
Dr. Robert L. Egbert
Dean of the School of Education
University of Nebraska
Dr. Phillips W. Foster
Professor of Resource Economics
University of Maryland
Dr. James G. Gosselink
Professor and Chairman
Department of Marine Sciences
Louisiana State University
Joseph L. Molder
Headmaster, Westover School
Middlebury, Connecticut
Phyllis S. Weikart
Assistant Professor
Department of Physical Education
University of Michigan
David P. Weikart
President, High/Scope
Educational Research Foundation

Editor
Charles Silverman

Editorial Assistance
Carolyn Ofiara
Jackie Torres
Nancy Brussolo

Design
Patrick Mullaly

Photography
Gary Easter

Copyright © 1979
High/Scope Educational Research Foundation
600 North River Street
Ypsilanti, Michigan 48197
(313) 485-2000

David P. Weikart, President
Charles R. Wallgren,
Director of Administration

The High/Scope Foundation is an equal opportunity/affirmative action (M/F) employer and institution.

Facing: 1979 has been proclaimed by the United Nations as INTERNATIONAL YEAR OF THE CHILD. In observance, High/Scope's institutional capabilities are being used to support world-wide efforts to improve services to children.

From the President —

2 REOPENING THE CASE FOR PUBLIC PRESCHOOL EDUCATION
David P. Weikart

While a quiet revolution in preschool programming has been going on, new studies of the long-term effects of preschool are demonstrating the remarkable staying power of early education experiences that took place almost 20 years ago.

4 PIAGET'S THEORY OF KNOWLEDGE: ITS PHILOSOPHICAL CONTEXT
William Fabricius

Psychologist Jean Piaget's influential theory of the "knowing process" has significant points in common with the philosophy of the 18th century German thinker Immanuel Kant. The author places Kant's revolutionary conclusions about reality and knowledge in the context of Enlightenment and Romantic philosophy, and explores some parallels and divergences between the Kantian and Piagetian theories.

14 THE ECONOMICS OF PRESCHOOL EDUCATION
Robert Halpern

How can preschool programs be "costed out"? What are the components of cost? What is the procedure for calculating the social-economic benefits of preschool? These and other questions pertinent to international policy are explored in an informative application of the "dismal science."

19 FORMAL ASSESSMENT OF CHILDREN'S WRITING
James T. Bond, Lynne Tamor & Robert D. Matz

Research underway at High/Scope is examining a range of established and experimental measures of children's writing abilities. One goal is to make possible more informed selection of writing tests and thereby to support improvements in educational practice since, increasingly, what gets tested determines what gets taught in our public schools.

30 THE ADVANTAGES OF EDUCATIONAL MODELS
Robert L. Egbert & Margaret E. G. Brisch

There's a special beauty, integrity and utility in early childhood programs derived from a single pedagogical perspective. These "models" are more likely to produce coherent and consistent results than the eclectic approaches that until recently have marked the field.

33 COMPUTERS AND EARLY LEARNING
Bernard Banet

Tiny, cheap computers and related electronic devices, all "talking" to each other, may have more uses in education by the end of the 20th century than paper-and-ink, blackboard and chalk: A golden age of learning? An age of dehumanization? Or just business as usual? Educators themselves can chart the course and help shape the future.

39 PARENT-CHILD INTERACTION AND CHILDREN'S LEARNING
Ann S. Epstein & Judith Evans

High/Scope researchers have identified several positive dimensions of parent-child interaction, and some negative ones, which predict children's scholastic performance. Their longitudinal findings point to the important conclusion that the mother-child relationship both influences and is influenced by children's early learning styles.

26 A Glimpse of High/Scope's Home

44 Reflections: High/Scope's Graduate Program

47 Notes & News

50 Contributors

51 Announcements

Reopening the Case for Public Preschool Education

From the President

THE USE of preschool education to ameliorate some of the effects of poverty on disadvantaged children has been a matter of controversy over the past decade. The enthusiastic early supporters of Head Start promised the doubters in national policy circles that a summer's program would enable disadvantaged children to "catch up" with their more advantaged peers and enter kindergarten with them as equals. Caveats from researchers and danger signals from early evaluations of Head Start projects did not dampen the enthusiasm of the supporters. Not until the rather gloomy Westinghouse-Ohio University report was released and received wide publicity did the early bloom begin to fade. But in the years since, Head Start and other programs for disadvantaged preschool-age children have actually flourished, becoming more sophisticated educationally and increasing their range of services. Moving away from an exlcusive focus on improving children's academic performance in the early grades, these programs have recognized that there are other legitimate goals of early intervention — improved health and nutrition, training of paraprofessionals, services to parents, to mention just a few. Programs for preschool-age children are now expanding, with more children being served and more support being generated by policy makers at all levels.

While this quiet revolution in preschool programming has been going on, information on the value and impact of preschool has been accumulating from a range of studies initiated in the 1960s and only now becoming available to the general public and the policy maker. Three of these studies were recently published as monographs by the High/Scope Foundation.

THE YPSILANTI PERRY PRESCHOOL PROJECT: PRESCHOOL YEARS & LONGITUDINAL RESULTS THROUGH FOURTH GRADE (Weikart, Bond and McNeil, 1978) is a study of the long-term effects of preschool education on a group of "high risk" disadvantaged children as they progressed through the early elementary grades. The study provides solid evidence, grounded in a rigorous methodological framework, that preschool made a difference in these children's lives: the impact of the preschool experience on their school achievement and grade placement, compared to the control group, has been positive and sustained.

THE YPSILANTI PRESCHOOL CURRICULUM DEMONSTRATION PROJECT: PRESCHOOL YEARS & LONGITUDINAL RESULTS (Weikart, Epstein, Schweinhart and Bond, 1978) presents and analyzes data from an experiment designed to compare the impact of three programs that represented the dominant approaches to preschool education during the late 1960s. The principal findings were that 1) the programs were equally effective both during and after preschool, and 2) the children's cognitive gains were still being maintained five years after they entered elementary school.

AN ECONOMIC ANALYSIS OF THE YPSILANTI PERRY PRESCHOOL PROJECT (Weber, Foster and Weikart, 1978) is a study of the social rate of return (the return to society) of public investment in the Perry Preschool Project. The benefits and costs for the experimental group were compared with those for the control group in a pioneering extension of the economic field of "investigation of human capital." In the analysis, the economic benefits of the preschool program were quantified; then, by comparing the costs of the educational program with these economic benefits, the rate of return on the investment was calculated. The results show that the costs were more than compensated by the benefits to society, in terms of 1) less costly education (i.e., less special education and institutionalized care) for the experimental group, 2) higher projected lifetime earnings for this group, and 3) time released from childcare responsibilities for the mothers in this group.

Taken as a whole, the High/Scope studies suggest that public investment in preschool education is a wise and economically sound social policy. I'd like to touch briefly now on some of the specific policy implications of these very hopeful findings. Two questions in particular stand out: Should public monies be invested in preschool education? and What can we learn from these studies about choosing a curriculum for a preschool program?

Should the public invest in preschool education to improve the long-term opportunities for disadvantaged children? Based on these studies, the answer is unequivocally yes. It appears that public investment in such programs not only reduces the costs of schooling for these children later on, but their projected lifetime earnings are increased; in crude economic terms, the children will cost less to educate and produce more for themselves and society.

Our benefit-cost study indicates that, for one year of preschool, the reduced costs of later education alone more than cover the costs of the program. For two years of preschool, the reduced costs of education and the future increased earnings more than cover the costs of the investment in preschool. What this means, in my judgment, is that the public is being negligent in not expanding national Head Start throughout the country to all disadvantaged children with similar pretest patterns. State and local education agencies that presently invest principal sums in elementary-level compensatory and special education programs should initiate preschool programs in cooperation with the national Head Start office, the Bureau of Education for the Handicapped, and the Title I Bureau of the Office of Education. These state and local agencies could realize monetary savings in the near future through reduction in high-cost special educational services.

Obviously such investment in public preschool education will not *automatically* pay off. The Ypsilanti preschool projects were closely supervised, quality-controlled efforts. The data from these projects indicate only what is possible for disadvantaged children under such conditions; they do *not* support the presumption that any kind of preschool program, so long as it conforms to government regulations, will produce outstanding long-term results. These cautions are necessary because of the tendency of educators, parents, and politicians to seek simplistic answers to complex questions. If the question is, Can preschool education make a difference in later school performance? then the answer can be a simple "yes." What complicates the issue is that the Ypsilanti results pertain to a special situation; insofar as similar conditions can be introduced elsewhere, similar results can be obtained.

Is there a single best curriculum for preschool education? Traditionally, educators and policy makers have sought the solution to the problems of education in the choice of curriculum—"How can we find," they seem to have asked, "or how can we devise, the ideal course of study for children?" But in truth, at least for preschool education, the selection of a curriculum appears to be important more for the discipline it brings to the operation of the project than for the specific content it provides for children. The process of selecting or devising a curriculum forces adults to search out and examine their own values and beliefs, as they come to grips with the profound questions facing anyone who tries seriously to provide the best possible education for children.

High/Scope's Curriculum Demonstration Project showed that three diverse curricula could be equally effective in improving children's academic aptitude and achievement. The Curriculum Demonstration Project also provides information about program operations, and in particular about what actually happens in the classroom. Observations during this project demonstrated clear distinctions between curricula on such variables as cooperative play among children, fantasy and imaginative play, individualized teacher-child interactions, competition, extensive opportunities to use materials, and praise for mastering new challenges. Clearly the choice of curriculum will be influenced by adults' valuation of experiences such as these.

In choosing between several preschool curricula with well articulated goals, then, it isn't a question of *what works* but of *how it works*. Any curriculum can be made to work well in terms of standardized aptitude and achievement tests.

With respect to outcomes broader than standardized tests, the High/Scope studies can offer only partial information upon which to base the choice of curriculum. If one defines the educational process—how children actually spend their time—as an "outcome" in itself, however, then observational data from the Curriculum Demonstration Project show that children in the three programs had very different outcomes by virtue of having very different experiences.

The ultimate outcome of any educational experience, however, is the kind of adult which each child becomes, and this is a question that must await further longitudinal research. □

David P. Weikart

David P. Weikart
President, High/Scope Educational Research Foundation

Piaget's Theory of Knowledge- Its Philosophical Context

by William Fabricius

Jean Piaget's first academic appointment was to the chair of philosophy at the University of Neuchâtel. But his autobiographical book, Insights and Illusions of Philosophy, *describes his gradual disaffection with speculative reasoning and argument. Largely for that reason he became a professional psychologist, "albeit one with interests centered on problems of epistemology." Piaget's psychological research seeks to provide the verifiable evidence, which philosophy could not, for a model of how knowledge is possible. An understanding of Piaget's theoretical position on the knowing process is thus necessary for a full appreciation of the impact of his research.*

Notwithstanding Piaget's defection from the ranks of philosophy, his theory of knowledge has many significant points in common with the epistemology of the great 18th century German philosopher Immanuel Kant. The perspective that Piaget shares with Kant can be understood if it is viewed in its historical/philosophical context: the 17th and 18th century movements of rationalism, empiricism and romanticism. This article sketches some of the philosophical quandaries of these Enlightenment philosophies, Kant's revolutionary conclusions concerning reality and the knowing process and some parallels and areas of divergence between the Kantian and Piagetian theories of knowledge.

The activity of knowing is no less related to our sense of reality and no less a world-building activity than the building of houses.

— HANNA ARENDT
The Life of the Mind

TOWARD the end of the 18th century, Immanuel Kant clearly foresaw the effect he was to have on the epistemo-debate that had begun with Descartes. "Hitherto it has been assumed that ***all our knowledge must conform to objects***. But all attempts to extend our knowledge of objects... have, on this assumption, ended in failure. We must therefore make trial whether we may not have more success... if we suppose that ***objects must conform to our knowledge***."[1] (Superscripts denote references at the end of the article.) This turning around of the relation between the knower and the object to be known was analogous, he said, to Copernicus' hypothesis that it was not the sun which moved around the earth, but vice versa.

Kant's "Copernican revolution" in philosophy might not have occurred had he not been roused from his "dogmatic slumber" by reading the Scottish philosopher David Hume. It was Hume, the radical empiricist, who awoke Kant to the failure of both rationalism and empiricism* to explain how our knowledge could conform to objects. We will look briefly at these two major forces in the modern European period, and then consider an interpretation of Rousseau's romanticism in order to set the stage for Kant's framework and its relation to Piaget.

Rationalism

Rationalism was encouraged by the successful application of mathematics to the physical sciences of the time. The results achieved by physicists using mathematics to explain natural phenomena suggested to many minds of the 17th and 18th centuries that the world as a whole was rational, and that philosophy could benefit from following the lead of mathematics. The philosophies that were developed on this assumption, generally speaking, were patterned after mathematical systems. They began with "self-evident" premises, not derived from experience but held to be logically and undeniably true. From these premises, rationalist philosophers deduced logically consistent conclusions which they held to be statements of fact about the world. The pattern of geometry, with its system of postulates, theorems, corollaries, etc., all forming a completely consistent, deductive whole, was a favorite of rationalists.

Rationalist epistemology gave the central role in knowledge to ideas, or concepts. The mind was often thought to contain certain "innate ideas," which might range from ideas of mind and matter to the idea of God. Rationalist philosophers conceived the mind to be actively at work in thinking through and putting together a more and more complete system of concepts. The important point in all rationalist conceptions of innate ideas, however, was that these ideas supposedly expressed how reality was actually structured. The implicit assumption of all rationalist philosophies was that reality itself is logical, consistent and deductive.

The criterion for the truth of a concept, then, was whether or not it was logically implied. In this way the objectivity of knowledge was assured against "subjective" ideas which could not be deduced from first premises. Thus, in a rationalist philosophy, the structure of knowledge is to be found preformed in the categories of deductive logic.

On the basis of their epistemology, rationalist philosophers could hold that what is logically implied must in fact exist. The general program, then, was to move from concept to reality — or from what is conceived to be necessarily true, by virtue of its being either self-evident or deduced from self-evident ideas, to statements about existing things. An example of this process is the ontological argument for the existence of God, repeated in one form or another by more or less all rationalist philosophers. In one basic form the argument runs as follows: "I have the idea of a Perfect Being; if this Being did not have existence it would not be perfect; therefore, the Perfect Being exists."

In all rationalist philosophers we can see this process of reasoning from idea to existence. In fact, when Descartes, the first of the modern rationalists, begins his re-thinking of philosophy he almost immediately establishes the "clear and distinct" idea as the criterion for truth; for example, the external world exists for him because he has a clear and distinct idea of material things. Later Spinoza will say: "The order and connection of ideas is the same as the order and connection of things."[2] And Leibniz will hold that the "clear and distinct" idea is not only an insight into the necessary existence of something, but also an understanding of its being the "best possible."

What should be clear from these examples is the crucial assumption of rationalism: that the structures of deductive logic coincide with the structures of reality.

Empiricism

If rationalism can be considered an experiment to see how far the model of

*Though it is necessary here to generalize about philosophical movements as though they were homogeneous systems of thought, it should be kept in mind that any individual thinker is only more or less representative of the movement in question.

mathematics was applicable to philosophy, then empiricism was the experiment to see how far the model of observational and experimental science could be applied to philosophy.[3] Whereas rationalist philosophers reasoned about the world deductively, from "self-evident" premises, empiricists took as their model the new scientific method of inductive reasoning from evidence given in experience. Thus the tendency of empiricism paralleled the creed of the physical scientists: to attempt to generalize and predict on the basis of observed facts alone, without appealing to unverifiable conceptions of the way reality "must" be. By grounding knowledge only in what was undeniably observed, the empiricists sought to avoid the logical but highly speculative systems of the rationalists. For all its scientific limitations, the method of systematic observation and comparison outlined by Francis Bacon at the beginning of the 17th century exemplified the spirit of "sticking to experience" that all empiricist epistemologies were to follow.

Empiricist epistemology gave the central role in knowledge to sense perceptions. In contrast to the rationalist conception of innate ideas, the mind was conceived by empiricists as a *tabula rasa,* devoid of ideas prior to experience. Empiricist philosophers viewed the mind as essentially passive in receiving sense data. Perceptions were held to come directly from reality, presenting an undistorted picture of objects and events. The implicit assumption of empiricist philosophies was that all aspects of reality are perceptible through the senses.

The criterion of truth for empiricists was verification by experience. In this way they provided for the objectivity of knowledge against any subjectivity that might enter as a result of some distortion or misrepresentation of information given in the senses. For empiricists, the structure of knowledge existed preformed in the physical structure of reality.

Nevertheless, as a consequence of their own epistemology, empiricists were forced to go beyond mere perceived experience at some point in their explanations of human knowledge. To one degree or another they all found it necessary to appeal to something beyond experience in order to assure the stability, predictability and organization of what we know from experience. We will refer to this problem, which became as much an issue for rationalism as it did for empiricism, as the problem of *accounting for the structural elements of knowledge*.

The structural elements come into empiricist epistemologies in various ways. Even Bacon, the strict inductionist, had to have some "fixed laws" to give unity and coherence to the multiplicity of our experience — while almost in the same breath he insisted that "in nature nothing really exists besides individual bodies."[4] Locke continually suggested that there are "primary qualities" of an object, such as "extension" or "divisibility," which are not perceived as such but are necessary in order to assure the permanence of the object. And Berkeley, while perfectly willing to abandon the primary qualities, found it necessary in his system to appeal to God as the guarantor of the constancy of our impressions of objects. The structural elements of knowledge are necessary, as the empiricists realized, but their explanation involved an appeal to something beyond the verifiable facts of experience with which empiricism began.

Hume's critique of empiricism and rationalism

The epistemological investigations of the 17th and 18th centuries were given urgency through the great advances made in physical science by Copernicus, Galileo, Kepler and Newton. The new scientists, when they were most successful, learned to use methods of reasoning that included both observation and the construction of mathematical models. This was in direct contrast to the dogmatism of the Middle Ages, and it sometimes led to confrontation, as in the case of Galileo. Nowadays, we tend to assume that we operate on a balance between specific cases and generalizations or interpretations, and we find ourselves using both empiricist and rationalist criteria for deciding what we will accept as true. But the problem that the new science suggested to certain philosophers, especially Kant, involved the epistemological explanation of this new process of observation and organization. The rationalist and empiricist explorations of this process each uncovered problems that Hume was to confront directly.

Hume brought the problems of empiricism to the surface when he insisted on adhering, come what may, to the basic empiricist thesis: since all our knowledge comes from experience, we cannot claim to know anything beyond experience. What Hume was implicitly questioning was empiricism's ability to account for the structural elements of knowledge. We will look at the implications Hume drew from the empiricist thesis for the structural elements of causality, objects and the self.

Hume reasoned that all we strictly experience in a causal situation is the conjunction of two events in space and time. Never, he said, do we experience the "cause" as such. In watching two billiard balls, for example, we see one approach the other and come to a stop next to it, and then we see the one that was at rest begin moving. We say that the first caused the second to move, but Hume pointed out that there is no specific sense impression of "cause" that we have experienced.

As regards objects, Hume held that, strictly speaking, when we experience what we

commonly call an "object," we experience only a certain configuration or combination of sense impressions. He reasoned that such a set of impressions carries with it no assurance of its necessary structure, nor of the continued association of those impressions in the form of a permanent object.

The concept of the self suffers a similar fate at the hands of Hume's analysis. Our experience of what we call our "self," he said, consists only of the experience of a series of psychic events such as specific desires, feelings, thoughts, etc. Nowhere, therefore, is there any specific experience of the underlying self.

Causality, objects and the self, according to Hume, are not given in experience, but rather are "read into" experience. As such they cannot be considered aspects of reality, or existing things, but only subjective contributions from the mind as the way the mind tends to associate and relate experience. We speak of "cause," for Hume, because of the tendency of our minds to associate contemporaneous events. And the same applies to "objects": if we are repeatedly presented with the same combination of impressions, we come to *expect* this combination, according to Hume, without ever having actually experienced the "object" behind them.

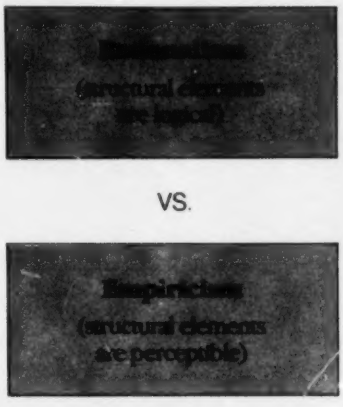
The effect of Hume's analysis was to point up the problem all empiricists from Bacon to Berkeley had to face: mere sense perceptions could not account for all the aspects of knowledge. Once it has been shown that all our distinct perceptions are separate existences,[5] then structural elements such as causality, permanent objects and the unity of the knower must be located somewhere else than in sense perceptions. But empiricist epistemology did not define any such location which would not involve the activity of the mind in "reading into" experience potentially subjective ideas and interpretations. Thus it appeared that the empiricists had been too quick to assume that the structural elements of knowledge existed in reality and were perceptible.

Hume was even more concerned to point up the problems that rationalist philosophers must face. His critique of rationalism was one of the most pointed and showed how rationalism, too, failed to account for the structural elements of knowledge.

Hume identified the basic rationalist problem as the attempt to logically deduce knowledge about existence. The proper place for logical deduction from first premises, he said, is mathematics, but even mathematical propositions, while true in themselves, do not give us factual information about the world. For example, the statement "All triangles have three sides" tells us something true about triangles, but it does not, and cannot, tell us that in fact there are any triangles. Hume applied this line of reasoning to the ontological argument for the existence of God. It is impossible, he held, to argue validly from the idea of God to the necessary existence of God. For Hume, necessity carried a *logical* force, but not an *existential* one. In the realm of logic, he pointed out, the contrary of a necessary proposition is impossible, while in the realm of existence the contrary is always possible. Thus we must speak only of the contingency and not the necessity of existence. Hume's answer to the ontological argument, then, is that God is either an idea that is necessary or a being that is contingent. And this critique he applied to all the propositions about reality deduced by the rationalists.

The effect of Hume's critique was to show that the structural elements of knowledge for rationalism, i.e., the categories of deductive logic, could not be applied to reality. Thus the rationalists, too, had been naive in their initial assumption that the structural elements of knowledge were logical and could exist in reality.

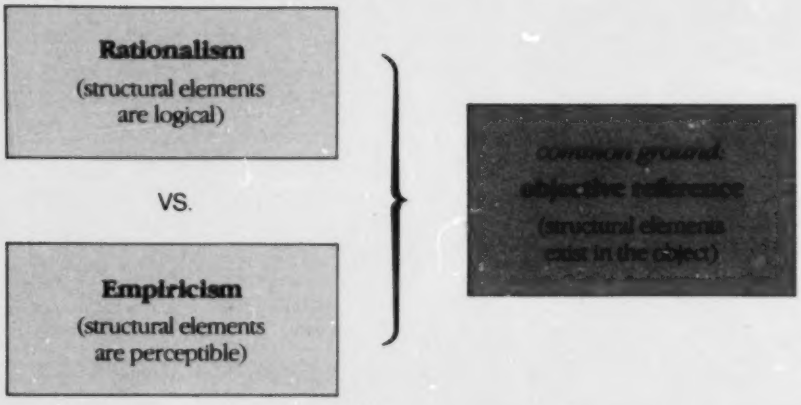
Hume's critique made sense to Kant, who was himself bothered by the fact that the rationalist systems, each one purporting to be logically deduced from self-evident premises, were not in fact prohibited from contradicting each other. And while Hume's empiricistic analysis helped awaken Kant from his "dogmatic slumber" within rationalism, it also showed him the failure of empiricism. Kant summed up the situation when he said: "Percepts without concepts are blind [his characterization of empiricism]; concepts without percepts are empty [his characterization of rationalism]."



The impasse had been created by both schools of thought sharing the assumption, as Kant pointed out, that our knowledge must be made to conform to objects. This assumption, however, stemmed from a more fundamental assumption of the 17th and 18th centuries — that reality exists in two layers, subject and object. This means that reality is composed of an external realm of objects and events that stands

apart from an internal realm of the subject, or one's state of knowledge, consciousness, etc.

The problem for epistemology on this basis was to show how knowledge could be founded on the object when the object is outside of the subject. Whether the "object" were the rational structure of reality or physical bodies and their predictable behavior, rationalists and empiricists attempted to explain how the subject could "go outside itself" to know the object. This unlikely situation necessitated finding some part of the subject which could step away from the rest of the subject's life and "read off," as it were, the structural elements of knowledge contained in the object. We have seen the failure of both percepts and concepts when they are required to perform such a task of making our knowledge conform to objects. Essentially, rationalism and empiricism were never able to explain how the structural elements of knowledge could exist in the object and be knowable. Thus the conclusion seemed to be either that knowledge was not possible, or that the structural elements of knowledge could not be located within the objective realm.



Rousseau's subjective reference

Why had rationalism and empiricism both assumed that the structural elements of knowledge had to be located in the object? This was the common ground on which they stood: knowing had to be grounded in a reference to the object, whether the structural elements were perceptible *or* logical. This was simply unquestioned up through the middle of the 18th century. The subject and object faced each other across a gap, which meant that any ideas or opinions not derived from the object could only be subjective and uncertain. The divergent paths taken by rationalism and empiricism only serve to show their common starting point: that an explanation of knowledge must begin with an objective reference.

The genius of Jean Jacques Rousseau lay largely in his insight that the structural elements of knowledge need not be located so remotely from the subject. Although strictly epistemological questions are not usually considered to have been his primary concern, it can be seen that his philosophy offered a radically new perspective on knowledge. Rousseau was able to ground knowing in a *subjective* reference.

In order to begin to see what this means we need to take a brief look at the impassioned plea Rousseau makes for trusting the immediacy of our feelings as against any approach that would lead us "out of ourselves" toward the object:

> Although all our ideas come from without, the feelings by which they are weighed are within us....
>
> To exist is to feel; our feeling is undoubtedly earlier than our intelligence, and we had feelings before we had ideas.... If the first beams of judgment dazzle us and confuse the objects we behold, let us wait ... [and] we shall soon behold these very objects as nature has already showed them to us.... Let us be content with the first feelings we experience in ourselves, since science always brings us back to these, unless it has led us astray.[6]

Rousseau had discovered that our knowing seemed to have its foundation in a primary, natural process governed by our feelings. The fact that our deepest feelings appeared to be naturally acquired and universally present in all societies was for him sufficient reason to make feelings the locus for the structural elements of knowledge. "...It is enough to lead you to distinguish between our acquired ideas and our natural feelings," he says.[7] As a result, there was no longer any need to analyze or to prove how the structural elements could be available to us from the object. For Rousseau, we have only to look within to find them already there.[8]

Nowhere is Rousseau's subjective reference more apparent than midway through *Emile*, where he inquires about what he can know with certainty. This arises when Rousseau is considering Emile's religious education, and the inquiry is set in the words of an exiled Savoyard priest whom Rousseau claims to have known many years before. The priest's creed is Rousseau's, and in an undertaking reminiscent of Descartes, he begins by first establishing his own existence. In some way even his method is similar to that of the great rationalist, since he begins with universal doubt and a resolution to admit only that which he cannot refuse to believe. Yet his criterion is entirely his own: there are no logical proofs for what he feels. Consider only his evidence for the existence of God: "I see God everywhere in his works; I feel him within myself."[9] So much then for all the rationalist "proofs" of the existence of God — and for the empiricist denials! The logical and perceptual

devices employed in the service of he objective reference become unnecessary with Rousseau. As he puts it: "Thank Heaven we have now got rid of all that alarming show of philosophy...we have found a...surer guide through this vast labyrinth of human thought."[10]

Feelings for Rousseau cover a wide range of human experience. Indeed, at times in his discussion a reader might wonder about their precise definition. Feelings include sense experiences that we continuously and passively receive from without;[11] they also include innate "decrees of conscience" by which we "weigh" our ideas and "perceive fitness or unfitness of things in relation to ourselves, which leads us to seek or shun these things."[12] These latter Rousseau identifies as self-love, fear, pain, the dread of death, the desire for comfort, as well as feelings that lead man to form societies.

In addition to these empirical and social functions, feelings for Rousseau also serve a metaphysical function, as we have seen in the case of the Savoyard priest. It is the certainty of his feelings that convinces Rousseau of the following principles: his own existence, the existence of the universe, the capacity of his mind to judge, the necessity for a first cause, and the existence of God.[13] And finally, Rousseau considers that we are capable of forming "ideas," which he defines as active judgments or comparisons that we choose to make about our sense experiences.[14] Such ideas are not given in sense experience, for "to see two things at once is not to see their relations nor to judge of their differences; to perceive several objects ...is not to relate them....These comparative ideas, *greater, smaller,* together with number ideas of *one, two,* etc., are certainly not sensations, although my mind only produces them when my sensations occur."[15] Active judgments thus differ from passively received sensations, but although the latter are feelings for Rousseau, he seems to classify the former as feelings also, at least in some respects.[16]

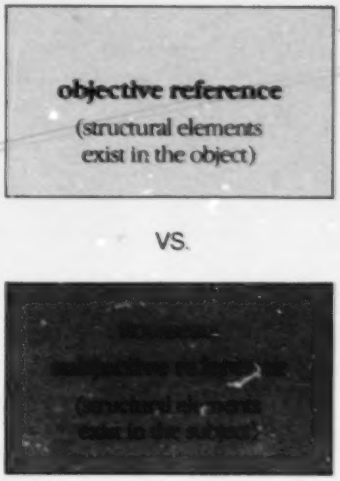
The fact that feelings can serve empirical, social, metaphysical and even judgmental functions shows their relevance to many of the things we might claim to know. By contrast, the structural elements of knowledge for rationalists and empiricists were located in mental activities that had more restricted ranges of application. Their concern with providing a reliable "link" to the object was prompted, as we saw, by the rise of scientific knowledge and its apparent ability to apprehend objects. Yet their overriding concern with the object resulted in either limited perceptual knowledge or justifications of statements about ultimate reality. Neither approach gave a unified picture of the inductive and deductive processes by which science progresses, or a more general account of our knowing processes in everyday experience. In that light, Rousseau's emphasis on feelings can be seen as a concern more with the knowing process than with the objects of knowledge. By focusing directly on the process, he was able to uncover more of its range and complexity.

The structural elements of knowledge for Rousseau are grounded in this natural, ongoing process of knowing, or, as he puts it, in our feelings. As a result, the subject has an expanded role to play in knowledge by becoming the reference point for determining truth or falsity. That role had belonged ultimately to objective reality for rationalism and empiricism. This aspect of Rousseau's subjective reference will influence Kant, in the sense that Kant will continue to define the role the subject plays in knowledge.

Rousseau never meant to suggest, however, that because the structural elements of knowledge exist within thesubject they aren't reflected in the objective realm. He agreed with all epistemologies within the subject-object framework that truth was ultimately in things and that knowledge had to conform to objects. But he went on to assume that our natural feelings coincided with the structure of things in reality.

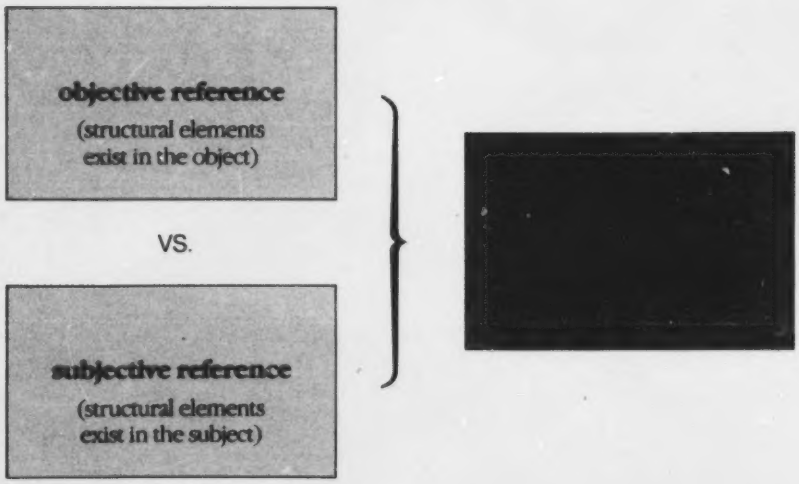
An obvious problem comes in when applying these structural elements to the objective realm by assuming that what the subject feels does in fact exist. The feeling that something exists is not the same as that thing actually existing. To paraphrase Hume we might say: the feeling may exist, while the thing may very well not. Rousseau evidently had no trouble reconciling his feelings about motion with Newton's discovery of the laws of gravitation, but one can't help wondering how he would feel about some of the nonclassical formulations of Heisenberg or Einstein. Physical science today leads us anywhere but back to the "first feelings we experience in ourselves." If Rousseau were to answer as expected that such things did not directly concern his life and therefore he wouldn't trouble himself with them, we could then question how useful his epistemology could be. It is true that Rousseau meant to have more impact on ethics than on epistemology, but even here there is doubt about how "sure" a guide feelings can always be. In Rousseau's ideal state, for example, he admits that there will be times when individuals will disagree about the general good and some will need to be coerced into agreement. For all his insistence that feelings can give us objective knowledge, Rousseau's position is by its very nature open to the charge of subjectivism.

Rousseau's ideas about the location of the structural elements of knowledge took place within the subject-object framework and were guided by the fundamental assumption that knowledge had to conform to objects. The



subjective reference of Rousseau's romanticism, along with the objective reference of rationalism and empiricism, represented the gamut of possible positions that could be taken to explain knowledge. In essence, these positions located the structural elements of knowledge within, respectively, either the realm of the subject or the realm of the object.

The problem for epistemology within this framework was how the structural elements of knowledge could by shared by the subject and objects. Whether the structural elements were in the subject or in the object, they had to *interact* with the other realm during experience and knowing: the subject must grasp what the object contains, or the object must corroborate what is within the subject. This situation necessitated some explanation of how the duality could be bridged, yet within this framework no viable solution to the problem had been found. Neither the subjective nor the objective reference was able to explain how the structural elements of knowledge could be located independently within one realm and then interact with the other during experience. The conclusion seemed to be either that knowledge was not possible, or that the structural elements could not be located independently in either the subject or the object.



Kant's phenomenal realm

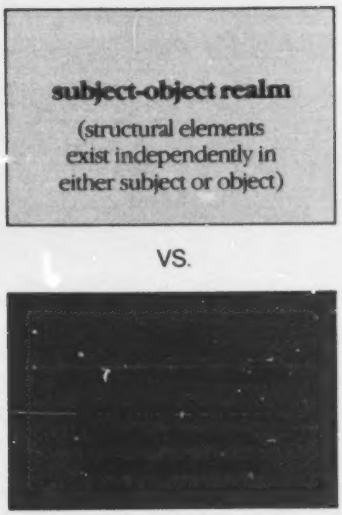
Why had empiricists, rationalists and romantics all assumed that the structural elements of knowledge had to be located in either one realm or the other? Regardless of their differences, this was the common ground on which they all stood. Descartes had discerned the two levels of reality which existed independently of one another, and there seemed to be no other place to locate the structural elements of knowledge.

The effect of Immanuel Kant's philosophy was to disclose a new level of reality. Between the subject and the object, he opened up a new realm—that of the phenomenon. He did this by concentrating on how the object *appeared* to the subject. Once he took this perspective, he was able to postulate that the structural elements of knowledge were located neither in the subject nor in the object alone, but in the phenomenal realm, where their function would be precisely to interact between subject and object in experience. The structural elements of knowledge, for Kant, were actual mental structures which organize our experience, and the phenomenal realm is defined by those structures. His stepping out of two-layered reality freed Kant from having to assume that our knowledge must conform to objects. From now on objects will conform to the structural elements of knowledge located in the phenomenal realm.

An analogy can serve to show what Kant meant by the phenomenal realm. Let us suppose that a man goes to a gravel pit to get small stones for his driveway. Before he arrives, a screen with holes ¼-inch in diameter has been used to separate out the smallest stones, which then have been put in a pile off to one side. As he approaches the pile he examines it briefly. Any one of a number of thoughts about the sizes of the stones might cross his mind before he plunges his shovel into the pile. He might reason inductively from the stones he can see, like a good empiricist, and conclude that the rest must be that size, or he might think there is some logic inherent in the pile being homogeneous if he is more of a rationalist. On the other hand, if he is a romantic he may go on his immediate feeling that this is the right pile and not have to think about it at all. In any of these cases, however, we could say that he had neglected the structuring function of the screen, and that his certainty would be best assured if he knew the role the screen had played in organizing his experience, so to speak.

The screen, then, is analogous to the phenomenal realm, where the structure of the mind gives certain forms to our experience. In this case, the "structural element of knowledge" is the ¼-inch diameter, and we can see both the new location Kant defines for structural elements and their inherently interactive role in experience. Before Kant, nothing like this had been conceived. Indeed, it had been the purpose of epistemology to explain how the subject did *not* interfere with the object when coming to know it. Until Kant, only "subjective" ideas could result if the mind added anything to the object. But Kant proposed that this is in fact what always happens, and that it is the universality of what the mind does to construct phenomena that gives knowledge its objectivity.

Our experience, Kant said in his *Critique of Pure Reason,* is always in the form of objects



because our minds have the structures of space and time. All of our perceptions of things are structured by the mind spatially and temporally into the form of objects. Thus Kant accepted Hume's thesis that we never experience what conjoins the percepts of "red" and "spherical", but he went beyond Hume to locate our knowledge of "ball" in the mind's structures of space and time.

Similarly, Kant showed that there are certain concepts, or categories, that will always apply to our experience. Once objects are perceived in space and time, they are then understood through the mind's structures of quantity, quality, relation and modality. These categories give our understanding certain necessary forms:

I. *Of Quantity*
   Unity (judgment of "one")
   Plurality (judgment of "many")
   Totality (judgment of "all")
II. *Of Quality*
   Reality (affirmative judgment)
   Negation (negative judgment)
   Limitation (infinitive judgment)
III. *Of Relation*
   Substance and Property (categorical judgment of "all, none")
   Causality and Dependence (hypothetical judgment of "if, then")
   Community and Reciprocity (disjunctive judgment of "either, or")
IV. *Of Modality*
   Possibility/Impossibility
   Existence/Non-existence
   Necessity/Contingency

Constructivism: Kant and Piaget

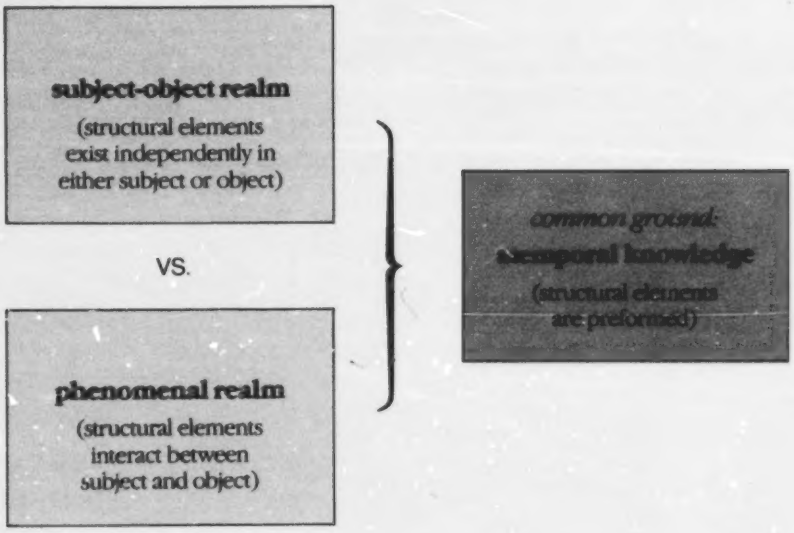
To borrow a term from Piaget, our experience is "assimilated" to the forms of space and time and to the categories of the understanding. Both Kant and Piaget give mental structures this central place in knowledge, and there are some parallels between them that can be drawn. Both locate the object concept in the mind's structure—Kant through the forms of space and time, and Piaget through the schemes of coordination of the infant's actions which culminate in the scheme of the permanent object. The intellectual operations that the child develops later, in Piaget's theory, are also analogous to Kant's categories of understanding, since they provide the relations among things we use in our understanding of the world. The mind contains these structures as ordering principles which can only begin to be recognized after they are applied to what is given in experience;[17] in this sense, both Kant and Piaget elaborate the *unconscious* elements in cognition.*

Whereas the mind is active, according to the rationalists, in deducing concepts from other concepts, and is passive, according to the empiricists, in receiving sense data, for Kant and Piaget mental structures must *interact* with sense data for there to be knowledge. The mind is not capable of knowing things beyond experience, nor is it merely a passive, empty receptacle for "contacts with experience and the fortuitous modifications due to the environment."[18] The interactive role of the structural elements of knowledge signals their constructive function in ordering and synthesizing what is given through the senses. The assumption for both Kant and Piaget is that reality is *constructed* to become the phenomena we experience.

Yet there is still a common ground which Kant shares with his predecessors and which distinguishes Piaget from him. Kant had searched for the *a priori* elements of knowledge, for those things which could be known prior to experience and which would not be contradicted by later experience. It was a credit to his genius that he was able to locate such elements within experience and not have them be dependent on it. He did this by showing how the phenomenal realm is actually a precondition for our having any experiences at all. But why had Kant been so concerned with *a priori* knowledge? One had to be at the time. Whereas the idea of a subject-object reality went back as far as Descartes, the idea of truth being unaffected by time went back to Plato. Kant, as much as anyone before him, had as his most basic assumption an atemporal idea of truth.

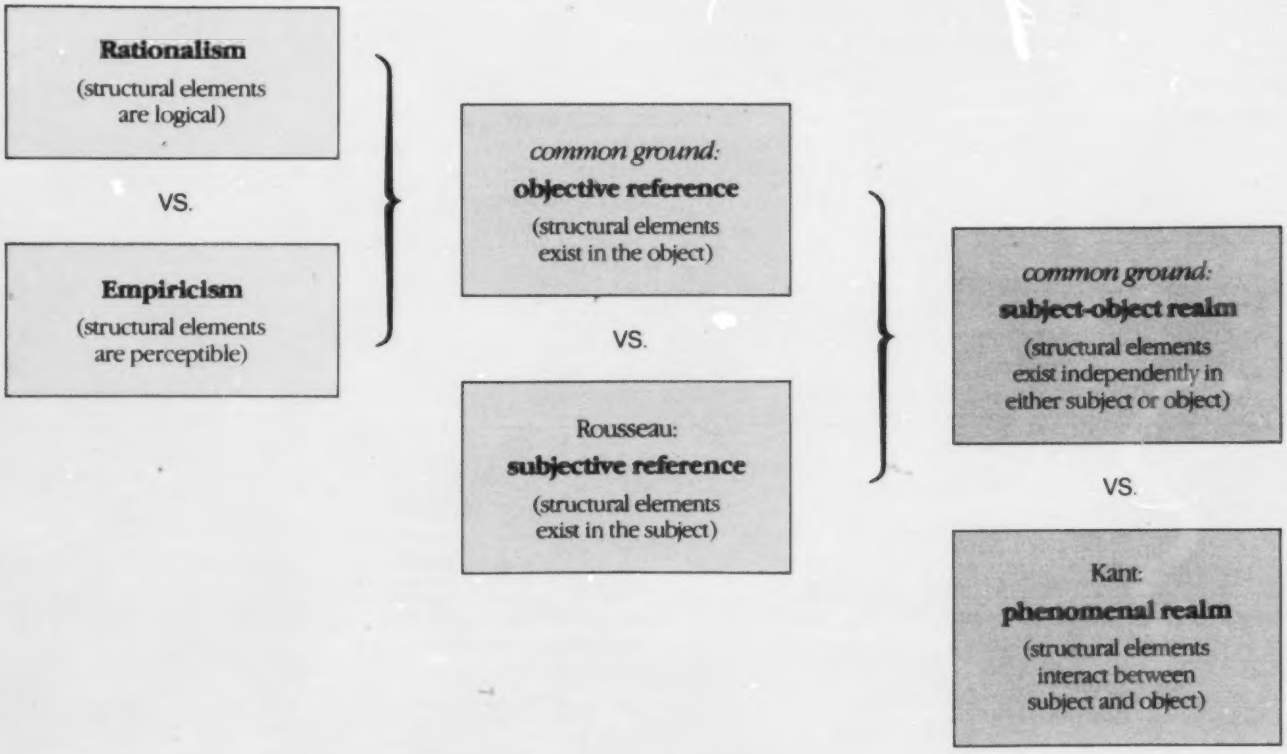
Already during Kant's time, this assumption of the atemporality of truth was being challenged by the rise of historical thinking—that is, by an awareness of historical change, which suggested ideas of development and progression. We can see in Piaget's epistemo-

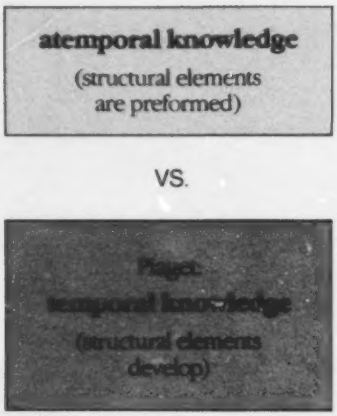
*Cf. Robert D. Matz, "Operativity and the Cognitive Unconscious," in *High/Scope Report 1975-76*.



logy an incorporation of that influence. His notions of accommodation and equilibration, which are foreign to Kant's *a priori* forms and categories, make Piaget's a more dynamic theory of knowledge in that it postulates mental structures which develop over time. Piaget thus goes beyond Kant when he describes his genetic epistemology as "a solution to the problem of development which reduces to neither an empirical process of discovery of a 'ready-made' external reality, [which can be taken as a characterization of the subjective-objective reference] nor to a process of preformation or predetermination (*a priori*), which would also mean believing that everything is ready-made from the beginning [which can be taken as a characterization of the phenomenal reference]. We believe truth lies between these two extremes, that is, in a construction which expresses the manner in which new structures are constantly being elaborated."[19]

What does this do for truth and objectivity? Piaget avoids stating that at some point in time they are reached conclusively; instead, objectivity "in no way is an initial property, as the empiricists would have it, and its conquest involves a series of successive constructs which approximate it more and more closely."[20] Time enters Piaget's epistemology in the sense that truth and objectivity are not "ready-made" prior to the mind's constructive activity in experience. As further psychological research explores the temporal process of this

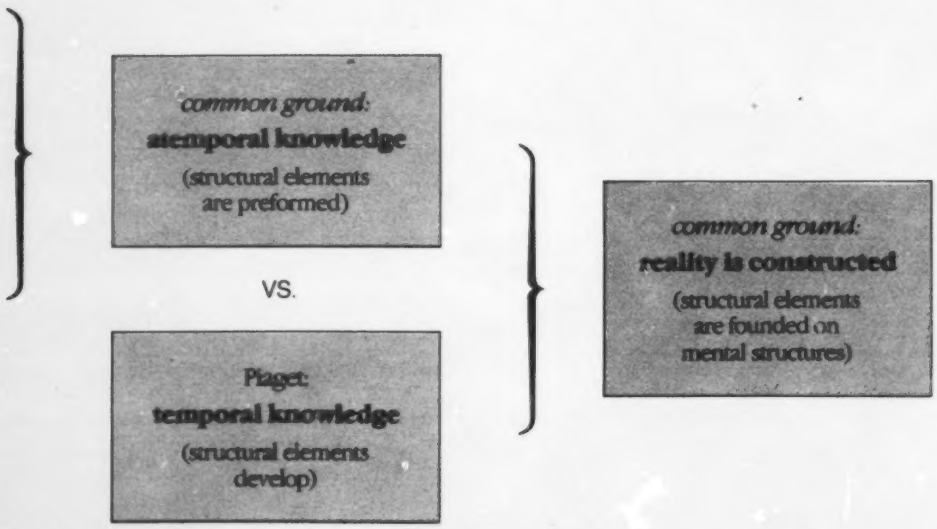




construction, modern epistemology must deal with the issue of temporality to understand why it is a necessary factor in our knowledge. Yet both psychologists and epistemologists are circumscribed by the common ground that Piaget in the end shares with Kant: within the phenomenal realm our scientific as well as our everyday knowledge cannot hope to reach beyond the mental structures on which it is founded, to grasp the ultimate nature of reality. □

REFERENCES

1. Kant, *Critique of Pure Reason*, St. Martin's Press, New York, 1965, p. 22.
2. Beardsley, Monroe C., ed., *The European Philosophers From Descartes to Nietzsche*, The Modern Library, New York, 1960, p. 172.
3. Copleston, Frederick S. J., *A History of Philosophy*, Image Books, Garden City, New York, 1960, vol. 6, part II, p. 197.
4. Burtt, Edwin A., ed., *The English Philosophers From Bacon to Mill*, The Modern Library, New York, 1939, p. 89.
5. Gilson, Etienne and Thomas Langan, eds., *Modern Philosophy, Descartes to Kant*, Random House, New York, 1963, p. 254.
6. Rousseau, *Emile*, E. P. Dutton and Co., New York, 1961, pp. 253-254.
7. *Ibid*, p. 253.
8. *Ibid*, p. 250.
9. *Ibid*, p. 239.
10. *Ibid*, p. 254.
11. *Ibid*, p. 165.
12. *Ibid*, p. 253.
13. *Ibid*, pp. 223-229.
14. *Ibid*, p. 166.
15. *Ibid*, p. 233.
16. *Ibid*, p. 253.
17. Copleston, *op. cit.*, vol. 4, p. 69.
18. Piaget, J., *Structuralism*, Basic Books, New York, 1970, p. 51.
19. Piaget, J., "Piaget's Theory," in *Carmichael's Manual of Child Psychology*, third edition, vol. I, John Wiley and Sons, New York, 1970, pp. 728-729.
20. Piaget, J., *The Child and Reality*, Grossman Publishers, New York, 1972, p. 107.



The Economics of Preschool Education

by Robert Halpern

A STRONG argument can be made in favor of investment of public monies in early childhood education, one that is especially attractive to social and educational reformers. Theoretically, and over a long period of time, planners and policy makers could look forward to increased equity and educational opportunity for poor children, greater efficiency of the educational system through decreased wastage, optimal development of human resources, and increased productivity for society. While many of these hypothetical benefits are beginning to be explored in the literature, several key programmatic issues remain unexplored. There is evidence, for example, that programs in developing countries designed to increase or modify cognitive capabilities of young children are not likely to lead to substantial redistribution of occupational and other opportunity in later years (albeit for many noneducational reasons). Should efforts, then, be directed more toward parents? Should early childhood programs be tied in to other community programs? It is through the family and the immediate environment that the child acquires attitudes towards work, a sense of self, and achievement potential; these factors appear to account for a larger proportion of the association between educational and economic attainment than cognitive ability per se; but many current early childhood programs do not involve families in any significant way. It is clear, then, that once a decision to invest in preschool education is made, a number of further decisions with important economic and social consequences remain. This article will attempt to establish an economic frame of reference for such decisions.

Costing Out Preschool Programs

The decision whether to invest in preschool education and what kind of investment to make can be arrived at in part through an examination of costs and benefits. A number of kinds of cost analysis are possible, depending on the information needs of the planner, policy maker, or administrator. Policy makers may want to choose between alternative investments based on their efficacy in helping achieve a set of socioeconomic goals, or on their rate of economic return to society. They may want to discover the least-cost strategy capable of producing certain effects. They may need information on which combination of inputs can most efficiently achieve a certain effect. They may want to know the costs of particular program components.

The various reasons for doing cost analyses are reflected in the four most common types of analysis usually undertaken. These are cost-effectiveness analysis, cost-efficiency analysis, cost-benefit analysis, and cost-utility analysis.

In *cost-effectiveness analysis*, different programs with the same or similar goals are compared, with the purpose of finding the least-cost method of providing a service that accomplishes these goals. In conducting cost-effectiveness studies, one must take care that not only broad goals but specific desired outcomes as well as the kind and quantity of inputs are similar between programs, or comparisons lose their meaning.

Cost-efficiency analyses are usually conducted to find the most efficient combination of inputs leading to a particular set of outcomes. Once a least-cost program strategy has been selected, a least-cost internal management strategy is needed. Such program components as personnel combinations, duration of treatment and daily hours, materials, curriculum, and target population can be manipulated so that optimal use of all is ensured.

In theory, cost-efficiency analysis should be going on continuously in any program. Historically, however, "cost consciousness" has been very low among educators in general and early childhood educators in particular. Also, it is often difficult to modify or eliminate program elements found to be inefficient (especially if these elements involve professional personnel). But

WEIGHING THE GAIN & LOSS

> Particularly in social programs and regulation, "economic rationalism" has increasingly moved this Administration from its party's tradition of more spending and more regulation to a case-by-case approach that weighs the social good against the economic loss, and often means spending or regulating less. "Will it cost more than it saves" has replaced at least in part "How can we do more social good" as a policy determinant... The proponents of the new methodology have been remarkably successful in extending concepts once the province of economists only. (Steven Rattner in *The New York Times Week in Review*, August 6, 1978)

Economic theory indicates that, in general, one should continue to invest in a particular opportunity as long as it continues to yield better returns than alternatives. This "rule" of resource allocation applies also to education. Though education at whatever level is a complex social process, and therefore difficult to quantify for economic purposes, in a world where resources are scarce it is clearly valid to look at goals, processes and returns and argue that education , like any other sector of society, must answer to economic reality. In this article, economic considerations pertaining to preschool education are explored in order to establish a framework for future economic analyses and suggest the most fruitful directions for them.

given the budgetary constraints facing many early childhood education programs and the great number of children in need of services, both in the advanced industrial societies and in the developing world, it seems logical that economic efficiency would be a central criterion for investment in early childhood education.

Cost-benefit analyses are usually conducted to find out the net value (benefits minus costs) to the individual child or to society of a particular investment in preschool education. Of concern in such analyses are the economically quantifiable costs and benefits. Economists have done much better in quantifying the costs, and while they acknowledge that unquantifiable benefits should be included in the cost-benefit picture, these benefits are usually left out of that picture.

Just as the decision regarding what to include as components of cost can change the cost picture radically, so can the decision regarding what to include as benefits. In early childhood programs especially, the majority of benefits are not only difficult to quantify but often become tangible only in the long term. Nonetheless, cost-benefit analysis will probably become one of the major tools used by policy makers and planners in deciding whether to consider early childhood education as one investment option among many in social development strategies.

One of the least explored, but potentially most valuable, cost analysis strategies for early childhood education is the *cost-utility analysis*. In such analyses various outputs — nutrition, health, education, for parents, for children — are value-weighted according to whatever criteria the evaluator chooses. Total output, usually in the form of points, is then divided by costs. Thus, two multiple intervention projects could be compared for their effectiveness as primarily educational programs with secondary nutritional components, or as nutritional and educational interventions. Using such analyses, two projects that cost the same but have different objectives or emphases can be compared according to their effectiveness in meeting priority needs of young children and families in a particular setting; outputs would be weighted to correspond to the priority needs identified.

Once an analyst is aware of the purpose of a particular cost analysis, it is possible to select the type of analysis that is most feasible and most useful. It is dangerous to do cost comparisons of two or more early childhood programs without taking into account the nature and extent of inputs and outputs from the programs. Preschool education programs can have very different objectives, use very different combinations of inputs, and be providing very different kinds of services. In any case, the cost criterion is only one among a number of types of criteria necessary for informed decision-making.

An important, but sometimes ignored, aspect of costing out preschool programs is the difference between budgetary *expenditures* and total program costs. The former represent only the money costs to the agency undertaking a program. The latter represent the economic resources of a society expended in the process. The difference between the two represents the "social cost" of a program. A close examination of total costs often entails giving some value to opportunity costs and costs of donated (including volunteer) services and goods.

The Components of Cost

In order to carry out cost analyses of preschool education programs, it is essential to know the components of cost of these programs. Depending upon the elements included in a cost analysis, the total cost of a program can vary by 50 to 75 percent. In addition to components such as administrative overhead, physical plant costs, and supplementary services, some of which can be "hidden" or joint costs, there are often costs to society, social costs, that are very difficult to ferret out. Without standardized costing procedures, comparative examinations of different programs can be misleading.

The most commonly used cost distinctions are between fixed and variable costs and between capital and operating costs. *Fixed costs*, such as start-up or program preparation costs, do not vary with the number of children or parents served, classrooms, teachers, or other elements. Variable costs, such as physical plant, teacher wages, materials, and training, vary with the number of recipients. *Capital costs* are usually one-time investments with a multi-year use. *Operating costs* are those costs that are recurrent from year to year, such as salaries, maintenance, and utilities.

Marginal costs, the increased cost per unit of expanding a program beyond size x, are particularly pertinent to early childhood education programs in Latin America, since most of these programs are relatively small in size and recent in inception. This suggests that many of the observed costs may decline over time as administrative procedures become routinized, economies of scale are attained, and policies become more consistent.

Nonetheless, although economies of scale can generally be seen to operate for overall program size, it is not so clear that they operate in terms of center size. Evidence from Chile, for example, indicates that in some cases larger centers cost more per child.

Other major cost categories often considered are joint costs, "hidden" costs, and opportunity costs. *Joint costs* are those incurred with other programs or sectors. *Hidden costs* are those stemming from "free" use of services, goods, or physical plant; although this use may be free for the program, it is generally a cost to some other agency or individual. *Opportunity costs* are those incurred by anyone involved with the program — child, parent, or staff — who can be said to be forgoing income because of involvement in the program; opportunity costs are not always easy to determine, especially for staff who are earning less than the minimum wage or may not be able to find employment elsewhere at the minimum wage.

Once total program costs are estimated they can be divided by the number of recipients to arrive at per-unit costs. Also, per-staff, per-plant, per-administrator, and related unit costs can be calculated. Most important to note is that this costing procedure can be carried out either at the program level — in which case a number of individual centers with varying costs per center are averaged out in terms of cost — or at the center level. Both kinds of data are valuable for economic decision-making.

Analyzing Benefits

While costing out preschool programs involves judgment of which components to include and how to value social costs, the costing process is very straightforward compared to analyzing benefits. Education in general, and preschool education in particular, is a complex social process yielding complex products, many of which are very difficult to quantify in economic terms. Yet in spite of this fact, for purposes of allocation of scarce public resources, "the economic rate of return is the only criterion which is comparable across all sectors of the economy" (Roger Grawe). Thus, for purposes of informed decision-making, the calculation of benefits whenever and wherever possible is both useful and necessary.

In general, benefits from education are said to accrue to individuals and to society. With respect to early childhood education, a number of the social benefits do not appear until many years in the future, and there is not only a judgmental element in their calculation but a projective, hypothetical element.

Benefits to individuals are generally seen to accrue to the child participating, to parents, and to siblings. The measure of benefits to each of the first two depends on the program focus. Those accruing to siblings appear in the form of spinoffs from changes in parental knowledge and behavior.

Whenever programs focus on services to disadvantaged children of preschool age there is a long chain of impact to be measured. In the poorer nations especially, immediate physical welfare (health and nutritional status) is improved. The child's ability and incentive to absorb schooling is generally enhanced. Ultimately, as a result of better health and better education, the child's future earnings are increased.[1] (The latter is closely related to increased productivity, a benefit usually considered to accrue to society.)

Calculating the differential earnings of the participating and nonparticipating child over the long run requires consideration of a number of economic factors, among them annual inflation rates (since the dollar received in the future is less valuable than one received today, future gains must be discounted), employment opportunities, salaries in various professions,

[1] Cf. *An Economic Analysis of the Ypsilanti Perry Preschool Project*, by C. U. Weber et al. Monographs of the High/Scope Educational Research Foundation, No. 5, 1978.

KEEPING A BALANCED VIEW

Certainly a higher internal rate of return would make the project economically more attractive. There are, however, other criteria (besides strictly economic considerations) for undertaking a social investment. Otto Eckstein has put the case well: "I do not believe that all investments should pass a narrow test of urban efficiency. Programs of human investment and of urban reconstruction have important social and redistributive goals which justify some sacrifice of economic efficiency." (from *An Economic Analysis of the Ypsilanti Perry Preschool Project*, by C.U. Weber et al., Monographs of the High/Scope Foundation No. 5)

and changes in the structure of the economy. In the developing countries many of these factors are not stable in their pattern of change over time, and this fact makes calculation of earnings 10, 20, or 30 years in the future very risky.

The benefit usually attributed to mothers is liberated time in which to work. How this benefit is calculated depends on a number of factors: whether or not the job she acquires is at the expense of another person or of her responsibility to care for other children in the home, the type of job, the fact that she may already have a job when her child enrolls in the program, and the number of hours freed each day for work.

For both the child participating and the mother there are a number of less tangible benefits—attitudinal, behavioral, knowledge-related—that affect personal and family satisfaction, ability to take advantage of future opportunities, and other aspects of life. While it is clearly important to consider these benefits when examining the cost-benefit picture, they generally cannot be quantified. Benefits accruing to siblings are also difficult to quantify.

For home-based programs in which program staff work directly with parents, the combination of benefits accruing to mothers and children would obviously be different. Not only would "liberated time of the mother" not be a benefit, but mother's time contribution might be seen as an opportunity cost. And since the educational program for the child might be more indirect, it would be more difficult to quantify.

One benefit to individuals not usually considered in cost-benefit analyses of early childhood and primary educational programs is the redistribution of government services and resources. While increased future earnings for participating children may imply a measure of income redistribution *in the future* in favor of these children, the present redistribution of society's resources to early childhood programs for poor children can be seen as a benefit. This is especially true when resources from general social-sector activities not specifically targeted to poor families are diverted to early intervention programs designed for these families.

A number of social benefits may be postulated to emerge from early childhood education programs targeted to disadvantaged children. One is increased productivity of participating children due to improved chances to enter the labor force. A second is greater efficiency in the primary education system due to lower levels of repeating and dropping out. A third is lower cost for remedial educational and social-welfare services since participating children would require fewer of these services. A fourth is the previously mentioned immediate redistribution of resources and longer-term redistribution of income.[2]

A broader approach to consideration of social benefits entails examination of social benefits as a whole and comparison of these benefits with those that might emerge from some other investment. The question of "rate of return" to society from an invest-

Photo courtesy The World Bank

[2]All of these benefits remain largely hypothetical, though the recently published economic analysis of the Perry Preschool Project (see previous footnote) provides evidence that some of them can be achieved through a tightly controlled and well conceived experimental program.

ment in preschool education rather than an investment in, say, family planning or remedial programs at the primary level is significant wherever a number of serious social problems exist.

Some Problems

Until relatively recently, preschool education was considered principally a consumption rather than an investment activity, and therefore little concern was shown for economic effectiveness and efficiency. As early childhood's role in human capital formation has become more widely recognized, so has the need for data to analyze early childhood programs in investment terms.

Methodological problems, pertaining mainly to quantification of benefits and standardization of techniques for comparative purposes, have long plagued economists of education. These problems are compounded at the early childhood level because so many benefits only become tangible at some point in the future, and because many of the benefits—such as enhanced ability to take advantage of schooling—form part of a "chain of impact," with individual benefits acting on each other.

The solution of these problems will require a greater commitment to early childhood education from economists of education than has been in evidence in the past. Longitudinal studies tracing the interaction of short-, medium-, and long-term benefits are needed, so that the current hypothetical models can be tested against empirical data. Methods for weighing nonquantifiable benefits along with quantifiable benefits must be developed so that cost-benefit studies can produce a more accurate picture of preschool education's economic viability.

The complexity of education as a social process and the dynamics of the larger social system create not only methodological problems but conceptual problems as well. They suggest, first, that economic viability should be only one of many criteria used in evaluating an investment in preschool education. Efficiency is only one of society's many goals. Economists of early childhood education must learn to make investment decisions based on noneconomic as well as economic factors.

Photos courtesy The World Bank

At a more pragmatic level, the complexity and dynamic nature of society, particularly in developing countries, make economic assumptions and guesses less than wholly reliable. Is a mother freed to take a job creating new income and productivity, or is she replacing someone else? What is the market value of a healthier child this year? Can the socioeconomic system support more graduates of higher education? What are the effects on other social-sector programs of diverting resources to early childhood education? To rely on past and present conditions to project future benefits in precise terms is a risky business indeed.

Studies are needed that provide a projective focus. These studies could explore the replicability of education models from an economic point of view: the expansion of current models; marginal cost implications; the prospect for intersectorally funded early intervention activities; and perhaps broad questions pertaining to investment in early childhood education as one of many investment options. Another area for economic analysis in future studies might be the economic effects of early childhood education on the family.

The economic analysis of preschool education programs should become an integral part of all formative and summative evaluation activity. At present, only a narrow range of performance data, often limited to IQ and achievement scores, are collected and used for planning and quality control. Collection of economic data should become part of broader efforts to analyze the social impact of early childhood programs.

In a world in which UNICEF's total annual budget to serve 102 countries, $207.5 million, is spent on armaments in approximately five hours (*New York Times*, June 7, 1978 Letters to the Editor), it should not be that difficult to justify increased investment to meet young children's needs. But many policy makers and planners remain skeptical. The examination of preschool education's economic viability will probably prove to be a key way to call the attention of national and international decision-makers to programs for young children. □

Formal Assessment of Children's Writing

by James T. Bond, Lynne Tamor & Robert D. Matz

The authors of this article doubt that current approaches to writing assessment adequately measure or predict children's powers to communicate through writing and believe that many tests actually foster educational practices which impede the development of writing effectiveness. Consequently they have undertaken a long-term research and development effort, under a grant from the Carnegie Corporation of New York, designed to evaluate current approaches to writing assessment and to develop more appropriate and valid measures. At the present time, their work focuses on children of elementary-school age.

THE PRESENT educational climate is one of crisis. A large segment of the public believes that our educational system has "gone to the dogs." According to prevailing rhetoric on the subject, the schools have become overly permissive — coddling trouble-makers, tolerating gross underachievement, indulging the frivolous interests of youth with curricular frills, and graduating students who cannot read, write, or compute. There is a growing consensus that "new fangled" approaches to education do not work, and that our only hope is to "return to the basics" before we become a nation of illiterates.

But the mainstream of elementary school education has not changed significantly within the memory of "back to basics" advocates. Elementary school curricula have always been and remain largely preoccupied with the specific facts and skills of reading (as decoding), writing (as encoding), and arithmetic (as computing). The "open classroom" movements of the sixties and seventies have not significantly altered the educational experience of most children. Thus, to insist that education "return to the basics" — meaning drill in the specific, memorizable facts of reading, writing, and arithmetic — is to insist that education remain essentially as it has been minus any elements of neoprogressivism that may have taken root.

The "new fangled" approaches to education which emerged during the sixties have not proved unworkable; quite the contrary, they have hardly been tested. Most of what has recently passed for "open" or "progressive" education in this country is but a pale imitation of the real thing, the institutional context of American education being inimical to substantive experimentation. The present shortcomings of contemporary public school education would appear, rather, to be the product of the very approach that "back to basics" adherents advocate.

Turning specifically to the teaching of writing, the preoccupations of teachers in the elementary grades have, for the most part, changed little over the years; teachers remain most concerned with handwriting neatness, spelling and punctuation, and "good" grammar, as though mastery of these mechanical skills and rules constitutes writing ability. The "back to basics" movement promises to perpetuate this confusion.

Writing, after all, is fundamentally a means for communication. The main purpose of writing is to represent information for one's own use or for communication to someone else. The most commonsensical measure of writing ability is how effectively one achieves these ends.

Formal assessment of writing tends to reflect and reinforce conventional educational practice, creating a vicious circle which is difficult to break. For many years, the dominant educational measures have been norm-referenced achievement tests — atheoretical measures constructed by judgmental samplings of conventional academic tasks and content which can be embodied in pencil-and-paper, multiple-choice formats. These tests do not measure actual writing, if by writing we mean the production of connected written discourse intended to communicate something to someone. Writing activity, if it occurs at all, is limited to spelling isolated words read by the

"Writing, after all, is fundamentally a means for communication. The main purpose of writing is to represent information for one's own use or for communication to someone else. The most commonsensical measure of writing ability is how effectively one achieves these ends."

tester. Other responses are expressed by marking one of several alternative answers to indicate recognition of the single "correct" answer. The targets of measurement in the area of writing parallel the objectives of conventional instruction — knowledge of spelling, punctuation, capitalization, and usage (usually grammar, occasionally diction as well). Typically, each of these areas is represented by a separate subtest.

Recently, the dominance of norm-referenced achievement tests has been challenged by objective-referenced (also called criterion-referenced) tests. The latter are intended to be curriculum-specific and to provide data which are interpretable without reference to population norms. In particular, the items on objective-referenced tests are supposed to represent the specific instructional objectives of the educational program utilizing the test. (In fact, items are frequently "purchased" from outside consultants or behavioral-objective pools and ultimately shape rather than reflect the local curriculum.) Test performance is interpreted, without reference to population norms, by comparing the number or proportion of correct responses by the same individual over time and/or by comparing the number or proportion of correct responses by an individual at one point in time with a criterion score representing what is expected by the schools, the state legislature, or whatever group is empowered to establish such expectations.

The strategy of establishing minimal expectations which all students must satisfy before being promoted or graduated characterizes the so-called "minimal competency testing" presently sweeping the country. Unfortunately most objective-referenced tests end up looking very much like traditional achievement tests, incorporating myriad micro-problems requiring only isolated bits of knowledge for their solution.

The impact of educational testing upon curriculum can be extremely far-reaching. Objective-referenced tests, in particular, tend to grow to monstrous proportions when left unchecked. Since their development does not require the establishment of population norms, and since most of their proponents see little or no need for evaluating measurement reliability and validity, they are inexpensive to fabricate and can be modified almost whimsically. Everybody's favorite behavioral objective can be added on, eventually creating a leviathan which dominates educational practice by completely defining curriculum content. Although this is not yet reality in most school districts, a few have already succumbed, and others totter on the brink under increasing public and governmental pressures for "accountability."

THE TENDENCY to reduce curriculum to what can be efficiently tested is supported by the now popular belief, deriving from behaviorist philosophy, that the ultimate goals of education can be broken into a finite number of behaviorally specifiable components, which if taught one-by-one through sequenced drill and practice will in the end equal the whole. Although faith in this possibility may ultimately be rewarded, contemporary behavioral technology is not up to the task. Higher-order skills seem inevitably to be overlooked in the process of decomposing educational goals into discrete behavioral objectives which can be taught by drill and measured by multiple-choice tests.

Writing ability is more than a simple aggregation of discrete skills and facts pertaining to handwriting, phonics, spelling, punctuation, capitalization, and grammar. Before any of these specific skills come into play, a writer must form a logically coherent mental representation of the intended message, shaping this fundamental idea structure to fit the topic and the rhetorical demands of the situation. And before rendering this message in written words, a writer must produce a linguistic encoding of the internal representation which reflects considerations of sociolinguistic constraints imposed by the context, specific characteristics of the intended audience, and elements of personal style, in addition to general linguistic conventions. The process of writing effectively requires the integration of myriad skills at all levels of the psycho-motor system. At this point, the components of writing ability cannot be fully specified, much less adequately defined in behavioral terms. And even if this were possible, there is little reason to believe that an educational program treating each component in isolation from the others would foster the integration of component skills required for effective written communication.

"At this point, the components of writing ability cannot be fully specified, much less adequately defined in behavioral terms. And even if this were possible, there is little reason to believe that an educational program treating each component separately would foster the integration of skills required for effective writing."

Nevertheless, reductionist curricula that are tied closely to conventional educational tests have surprisingly broad appeal. Those who believe that the central purpose of instruction at one grade level is to prepare children for academic work at the next find the finite sequences of specific behavioral objectives reassuring. Those who equate educational success with test performance appreciate the close match between curriculum and test content. And those who lack confidence in teachers and students are infatuated with the apparent "teacher proof" and "child proof" qualities of such approaches. Like assembly lines in industry, behavioral technology in the school removes decision-making responsibilities from the classroom and requires but rudimentary applications of intellect and creative energy to make the system work.

Rather than debate the merits of one approach to education over another on philosophical grounds, we suggest that attention be turned to the criteria by which educational success is measured. Unless conventional educational tests actually measure children's progress toward ultimately important educational goals, it is foolish to design educational programs to maximize performance on these tests. With reference to writing, unless the abilities to spell disparate words on command, to recognize punctuation errors in someone else's prose, and to recognize departures from standard English usage are indicative of abilities to write effectively for purposes of communication, the goals of education are not served by teaching to conventional tests.

In fact, conventional tests, including mass-marketed achievement tests, are of undetermined validity. That is to say, an individual's performance on a particular test on a particular occasion cannot justifiably be interpreted as indicating (1) how that individual would perform nontest tasks, particularly life-tasks, of ultimate concern to educators (criterion-related validity); (2) whether or not that individual has acquired whatever psychological structures an educational program is intended to cultivate (construct validity); or even (3) how that individual would perform other tasks drawn from the same domain as the items on the test (content validity).

Although strong claims are made for the content validity of conventional norm-referenced and objective-referenced tests, these claims are generally based upon expert judgments of the representativeness of item content rather than empirical validation studies. Even if these claims were substantiated, however, one could only conclude from a child's performance on a particular punctuation test, for example, that the child would perform similarly on other punctuation tests constructed in the same manner. And since the ultimate goal of education is not that students learn to take tests, but that they acquire the knowledge, skills, and motivation to become productive members of adult society, high content validity does not in itself recommend a test for purposes of educational assessment.

Unless test results tell us how well children will perform important nontest tasks (criterion-related validity) and whether they possess the knowledge, attitudes, or motivations which we seek to instill (construct validity), they are of little use. Test developers seldom attend to these aspects of validity; yet test users almost universally make interpretations of test results which presume criterion and construct validity. Given the remoteness of test-tasks from life-tasks, any generalizations from test results about a child's preparedness for life seem farfetched.

Of late, developers of educational tests for students in the higher grades, typically high school, have attempted to construct instruments which embody tasks more closely resembling life-tasks that students will encounter upon graduation. The minimal competency or proficiency tests being developed by some states and local school districts best illustrate this trend. Test tasks may include balancing a checkbook, reading and answering questions about a recipe, even writing a job application. Although tests eliciting and evaluating written discourse are not in general use at the secondary level, interest in them is growing.

No such trend is evident, as yet, in routine educational assessment at the elementary school level; however, promising instrument development is occurring outside the mainstream of educational assessment. Best known are the National Assessment of Educational Progress (NAEP) writing exercises, some of which are intended for fourth graders. These exercises include writing to reveal personal feelings, writing to communicate in social situa-

"Unless the abilities to spell disparate words on command, to recognize punctuation errors in someone else's prose and to recognize departures from standard English usage are indicative of the ability to write effctively for purposes of communication, the goals of education are not served by teaching to conventional tests."

tions, writing to communicate in scholastic situations, and writing to communicate in business or vocational situations. High/Scope's Productive Language Assessment Tasks (PLAT) provide another example of recently developed instruments intended to measure children's powers to communicate through writing. The writing tasks embodied in both NAEP and PLAT exercises simulate life-tasks for which instruction must prepare students if formal education is to realize its ultimate goals. The dimensions along which students' writing is evaluated in the NAEP and PLAT procedures parallel those along which judgments of writing competence are made in everyday communicative contexts.

The NAEP exercises comprise a wide variety of writing tasks, ranging from simply addressing a letter, to writing an imaginative story, to writing a persuasive letter to a school principal about effecting a change that would improve one's school. Two approaches to textual analysis predominate in current NAEP procedures. Some pieces of writing are evaluated holistically by having readers rank-order written products in terms of "overall quality." The evaluative criteria shaping the judgments of individual readers are intentionally left undefined. Earlier research conducted by the NAEP has shown that these ratings are positively correlated with correctness in writing mechanics, amount of syntactic embedding, and complexity of vocabulary. That is to say, global judgments of quality tend to be strongly influenced by superficial linguistic form that may or may not be correlated with characteristics of the text which bear more directly upon communicative effectiveness.

The other approach to textual analysis employed by the NAEP has been dubbed "primary trait scoring." Primary trait scoring is guided by analysis of the rhetorical characteristics of specific tasks. Writing performances are evaluated in terms of the degree to which they satisfy the rhetorical imperatives of particular writing tasks defined in terms of purpose, audience, and mode of discourse. The simplest of NAEP primary trait variables are defined in terms of inclusion/exclusion of discrete items of content. For example, in a writing exercise that involves taking a telephone message for someone else, satisfactory performance depends upon including the name of the caller and the time, day, and place of meeting, without which the message would be ineffective. More complex primary trait analysis is applied in analyzing persuasive discourse, satisfactory performance depending upon molar features of the discourse structure—e.g., systematically identifying a problem, explaining why it is a problem, explaining how to solve it, indicating benefits that would result.

Current primary trait scoring procedures employed by the NAEP have several limitations. They are tied so closely to specific tasks, particularly task instructions, that they lack generality. They tend to differentiate writing performances into broad categories which inadequately reflect variations in both quality of reasoning exhibited and potential communicative effectiveness. And they do not consider "secondary" traits which may have an important bearing upon successful communication. This is not to suggest that current NAEP methods have no utility for writing assessment, only that they do not serve all purposes of assessment.

The development of analytic variables for High/Scope's PLAT has been in some respects similar to the development of NAEP primary trait variables. The central focus of PLAT analysis procedures is assessment of how effectively children's writing serves (or would serve) specific communicative purposes in relation to particular audiences. The PLAT has two tasks, one requiring that the child write instructions for making something (Instruction Writing Task, or IWT), the other requiring production of a dramatic story (Story Writing Task, or SWT). Collectively, PLAT variables appear to have fewer limitations than NAEP primary trait variables.

PLAT variables differ in their generality but are not narrowly bound to performances elicited by a specific task. Their relatively high generalizability is in fact necessitated by the nature of PLAT elicitation procedures, which define generic rather than specific writing tasks. In the IWT, children first make things of their own choosing out of unstructured materials, then write instructions which are supposed to help someone who has not seen their products make the same things. In the SWT, children write dramatic stories with characters and plots of their own choosing. The resulting diversity in content and form requires more general analytic proce-

"Unless test results tell us whether children possess the knowledge, attitudes or motivations we seek to instill, they are of little use. Test developers seldom attend to these aspects of validity. Given the remoteness of test-tasks from life-tasks, any generalizations from test results about a child's preparedness for life seem farfetched."

dures than the majority of NAEP exercises.

Collectively, PLAT variables also appear to more finely differentiate variations in writing performance. For example, text elicited by an NAEP instruction writing task is only evaluated as adequate or inadequate based on rather impressionistic judgments of whether the writer has included all of the necessary steps with sufficient detail for someone to follow the procedure. While this particular NAEP variable has high generality, it minimally differentiates responses. IWT analysis procedures, on the other hand, involve rather fine-grained elemental analyses of text into instructional steps, and of steps into component elements pertaining to materials identification, definition of action, and spatial information. This procedure not only serves to better differentiate writing performances in terms of potential communicative effectiveness, but also pinpoints specific inadequacies due to unreasonable presuppositions. The levels of performance identified make sense in terms of cognitive developmental theory, particularly theory dealing with role-taking ability, and provide a basis for constructive feedback to writers and for instructional decision-making by teachers.

PLAT variables also provide a more multifaceted picture of variation in writing performance, making for more comprehensive assessment. For example, recently devised SWT variables assessing (1) adherence to the conventions of standard written English and (2) ambiguity introduced by departures from standard written English can be applied to all writing intended to serve social functions. While the first variable set parallels traditional achievement test measures, albeit requiring production rather than simple recognition, the second set focuses upon those departures from conventions which significantly interfere with the comprehensibility of written discourse. Development of these latter variables reflects the test authors' belief that writing instruction in elementary school should emphasize mastery of conventions when they are important to effective communication rather than mastery of conventions for conventions' sake—particularly when students speak nonstandard dialects of English and/or come from marginally literate environments. Other SWT variables are designed to measure cohesion or connectivity of discourse, crucial to the construction of propositional structures which can be comprehended as logically integrated wholes by a reader. Component variables defining cohesion include measures of ambiguity in nominal and pronominal reference, logical contradictions and hiatuses within and between sentences, the occurrence of false starts and unintelligible sentence fragments, the inclusion of extraneous information, and uncontrolled shifts in point of view. Most of these variables could be applied in evaluating the communicative effectiveness of writing in general. Moreover, they focus attention on features of written discourse which are seldom singled out even in informal evaluations of writing, but which provide useful foci for self-evaluation, teacher evaluation, and instructional activity.

THE VARIABLES reviewed here represent a small but significant sample of new and promising ways of analyzing and evaluating children's writing. They go substantially beyond traditional criteria of writing skill embodied in conventional educational tests and begin to define writing quality in terms of communicative effectiveness—the ultimate goal of writing instruction. Moreover, all of the NAEP and PLAT measures of writing require that children produce written discourse rather than merely evaluate what someone else has written by selecting predetermined answers within a multiple-choice format. In short, by setting new standards for what constitutes evidence of writing ability, this new wave of writing tests promises to influence the nature of writing instruction in our schools—provided, of course, that they can successfully challenge the dominance of conventional achievement tests.

While optimism is certainly warranted, it should be guarded. The new breed of writing tests, represented in this discussion by NAEP writing exercises and the PLAT, require considerable development before they will become competitive educational measures. Unless such tests become a routine part of formal and/or informal evaluation activity, their influence upon educational practice will be minimal. Major impediments to their widespead utilization arise from difficulties and costs of data collection and proces-

"To expect a child to generate coherent written discourse on a particular topic in 30 minutes at the drop of an unknown tester's hat may be quite unreasonable. Yet to create situations for writing which closely resemble those in which children generally choose or are generally expected to write may be impossible within the constraints of formal assessment."

sing. While NAEP exercises can be administered efficiently and at relatively low cost, even the simplest of holistic and primary trait analyses require highly trained coding staff and close supervision. As yet, there are no organizations in the business of coding writing samples from elementary school evaluations; few local school districts have the resources and motivation to assume the burden. Although the costs of collecting and processing writing samples can probably be reduced, it is unlikely that their efficiency will ever rival that of multiple-choice achievement tests. An alternative to testing all students in district-wide evaluations would be to collect data on carefully selected subsamples, or even to restrict the use of tests of written discourse production to informal assessment conducted entirely by teachers for purposes of documentation, planning, and evaluation.

Another problem that must be overcome in the development of writing tests for formal educational assessment is measurement reliability — more broadly, generalizability. Generalizability is an index of the probability that measurements of individual behavior obtained under a particular set of conditions (e.g., a particular writing task administered by a particular tester on a particular day) would be replicated over a specified range of conditions (e.g., some class of related writing tasks, testers having certain characteristics, any occasion during a specified time interval). We all know how difficult it is to write on some occasions on particular topics under certain conditions for particular audiences. To expect a child to generate coherent written discourse on a particular topic within a period of thirty minutes at the drop of an unknown tester's hat may be quite unreasonable. Yet to create situations for writing which closely resemble those in which children generally choose or are generally expected to write may be impossible within the constraints of formal assessment. Consequently, we may be forced to live with a certain amount of variability in writing test performances which is due to natural fluctuations in motivation and readiness to write.

These and many other considerations of generalizability are of substantial practical importance for those who would utilize writing tests to inform educational decision-making. Traditional tests of achievement and aptitude are in the enviable position of possessing demonstrated generalizability of individual scores across at least some conditions of measurement relevant to educational assessment. What little is known of writing test generalizability at this time suggests that comparable levels of generalizability should not be expected for most scores obtained from analyses of a single writing sample. Assuming that the generalizability of individual scores from one-shot tests cannot be substantially improved, there remains the strategy of averaging (or otherwise combining) multiple measurements of the same individual, or of aggregating individual scores and evaluating the performance of larger units such as the classroom or school. The former strategy is probably too costly for all but experimental studies; the latter is unsuitable for individual assessments required for decisions regarding promotion, certification, and school or job placement. Only further methodological research such as that currently being undertaken by High/Scope staff will reveal whether or not substantial improvements in writing test reliability are possible without sacrificing efficiency or restricting writing assessment to program evaluations.

Ultimately, to be of value for educational decision-making, writing tests must be shown to measure writing abilities which account for communicative competence. High generalizability allows us to conclude that a student's score from a particular administration of a test is probably very close to the score he or she would have on the same test under other specifiable circumstances. High generalizability in itself, however, does not ensure that a test measures what we want it to measure, that it is a valid measure of writing abilities. The uncertain content, construct, and criterion-related validities of conventional educational tests have already been discussed. The same criticism applies to writing tests like those developed by the NAEP and High/Scope. Given the impact which formal assessment has upon both educational practice and decisions affecting the lives of students, more than impressionistic judgments of instrument validity — "face validation" — is surely required.

Validity is most accurately not a characteristic of a test but of the inferences made from the measurements

"Is the level of performance observed for an individual in the pseudo-communicative context of a test predictive of performance in situations which have genuine communicative significance? Do writing tests so violate the integrity of the natural writing process (allowing little or no time for incubation, planning and rewriting) that the performances bear little or no relationship to life-situated performances?"

obtained with a particular test. Most important to educational decision-making are inferences which treat test scores as indicators of (1) how a student would perform analogous or related tasks which occur in the context of daily life in or outside of the classroom (concurrently with test administration or in the future) and (2) specific, and relatively stable, characteristics of the psychological system of a student which are the result of learning and development. In the first instance, criterion-related validity is at issue; in the second, construct validity. On the one hand, evidence of criterion-related validity might allow inferences that a child would (or would not) successfully complete a mail-order form, write a routine business letter, or take an adequate telephone message in the context of daily life. Evidence of construct validity, on the other hand, might permit inferences about a writer's general ability to coordinate two or more ideas in a single statement, to anticipate the response of a reader, or to choose appropriate levels of formality in discourse.

Depending upon the uses to which test results are put, one may be more or less concerned with one or the other type of validity. In the case of minimal competency testing for high school graduation, for example, parents and employers may be exclusively interested in the implications of test performance for life and on-the-job performance (inferences requiring criterion-related validity). Teachers responsible for the remedial instruction of students who have failed the test, however, may wish to make inferences about psychological constructs which account for performance. Further, especially in tests subject to public scrutiny, face validity becomes an issue. A test must "make sense" to those who administer it, those who take it, and those who read about the results.

ALTHOUGH the authors of this article seriously question the validity of conventional educational tests as measures of writing ability, and would claim greater face validity, at least, for the PLAT, they are unable to cite empirical research findings that strongly support their subjective judgment. The meaning of writing test measurements may differ substantially for different children or even for the same children at different points in time. For example, different children may construe the nature of a particular task differently, and the evaluator may or may not want differential ability to comprehend task instructions (or differential knowledge of imaginary audience, or whatever) to be reflected in the scores derived from test performance. If a written report appears to presuppose too much information for the "general" reader, are we to conclude that the writer: (1) did/could not generate a comprehensive internal representation of what was to be reported; or (2) generated a comprehensive internal representation but did not adequately encode the propositional structure, lacking linguistic knowledge or being unable to take the role of the general reader; or (3) could have encoded the underlying propositional structure more fully but deliberately chose not to because the message was intended for an informed reader (or because it would have been too much work, etc.)? Is the level of performance observed for an individual in the pseudo-communicative context of a test predictive of performance in situations which have genuine communicative significance? Do writing tests so violate the integrity of the natural writing process (allowing little or no time for incubation, planning, and rewriting) that the performances bear little relationship to life-situated performances?

These and many other questions regarding the validity of both conventional and alternative tests of writing abilities must be raised and eventually answered if we are to use educational tests wisely. Research now underway at High/Scope has begun to examine a broad range of established and experimental measures intended to tap writing abilities of children in the upper elementary grades. It is hoped that this research will substantially increase the empirical basis for claims about what can and cannot be inferred from children's performances on different educational tests. It is further hoped that this knowledge will permit more informed selection and utilization of writing tests to support progressive improvements in educational practice in place of the defensive and faddish reactions presently sweeping public school classrooms. □

28

A Glimpse of High/Scope's Home

In 1975 the High/Scope Foundation moved its headquarters into one of Michigan's larger historical homes, the Hutchinson House, built in 1898 by Byron Shelley Hutchinson, founder of the S&H Green Stamps business. The original house had 33 rooms, an indoor swimming pool, a ballroom with orchestra loft and one of the country's first elevators. Throughout the house there are stained and leaded glass windows and ornate woodwork and mantels. Over the years the house has had many owners and at one point was converted into 14 apartments. Fortunately the remodeling was done carefully enough not to destroy the basic fabric of the building.

We felt we could make a contribution to the community by preserving this historic structure while converting it into an unconventional but highly attractive working environment. Such a task was well suited to an organization of our size because we could use the building as a whole (its division into apartments had obscured many lovely features) and because, as a nonprofit organization, we could locate resources to support the restoration.

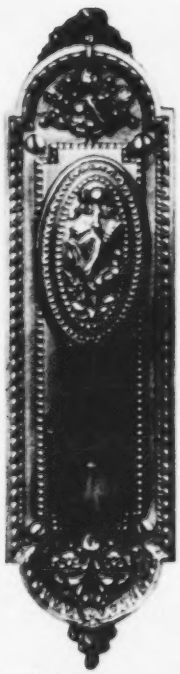
In our conversion and restoration efforts we are trying to retain the "feel" of the original rooms. For example, the opulent living room remains a formal area which is used for receptions and staff meetings, and we have decided not to break some of the larger, more stately rooms into smaller offices. Though this means that some staff members must share office space, many say they prefer a desk in a spacious, high-ceilinged, elegant room to the cramped cubicle they might have in more conventional quarters.

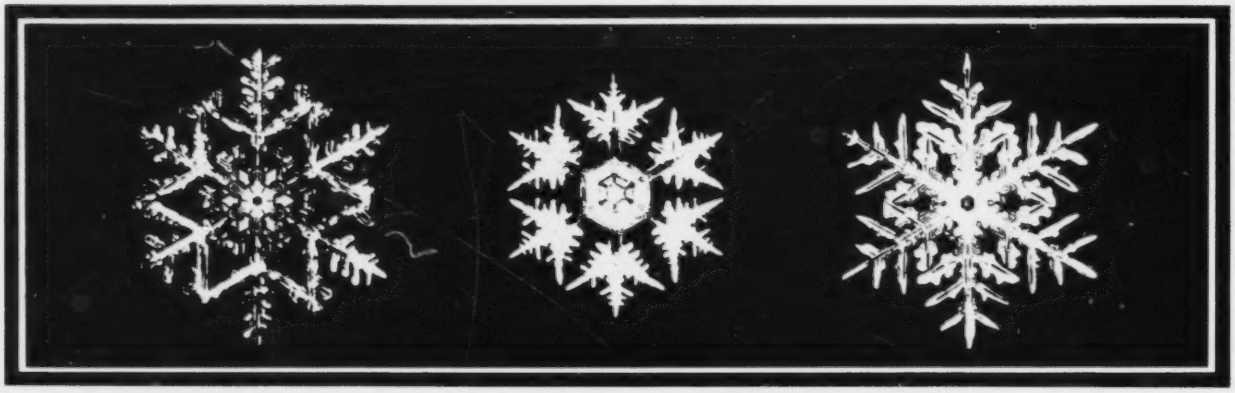
The Hutchinson House is an example of Queen Anne architecture, a style one author describes as "growing organically from the inside out." The inner structure determines the outer shape of Queen Anne buildings, resulting in a picturesque blend of towers, curves, lines and shapes. The Hutchinson House, with its turrets, peaks, gables and rounded solarium roof certainly fits this description.

The Hutchinson House also has elements of the "Robber Baron" tradition, whose hallmark is extensive borrowing from other buildings and periods. For example, instead of using the traditional stucco infill between the exposed half-timbers on the second and third stories, Hutchinson chose stone to fill in between the planks. He designed the dining room after the one in Kaiser Wilhelm's castle, which uses Greek Revival columns and massive, boxed-in dark oak beams. In the living room the ornate plaster moldings and finely designed rosettes for hanging the chandeliers are reminiscent of the Baroque era. Instead of using stained glass in the entrance and stairways only, a convention of the Queen Anne style, Hutchinson used it throughout the house. In order to incorporate all of his ideas into his home, Hutchinson had to make it much larger than most homes in this period.

After two years of using the Hutchinson House for office space, we feel we have succeeded in adapting the building to our organizational needs. We currently employ a full-time master carpenter to handle the bulk of the preservation work, and we hold periodic open houses so that community members can see the progress of the restoration. We plan to continue to restore as much of the building as is practical to meet our needs and to preserve this landmark for the future.

—Charles R. Wallgren
Director of Administration





Singularity versus Eclecticism in Early Childhood Education

The Advantages of Educational Models

by Robert L. Egbert & Margaret E.G. Brisch

THERE IS a special kind of beauty, integrity and utility in educational approaches derived from a single philosophical/psychological perspective. Such "models," as they are often called, are easier to understand, easier to work within, easier to explain and more likely to produce useful, coherent, consistent results than are eclectic programs. Until relatively recently, they were rare in education, and early childhood education was no exception. Within the past few years, facilitated in part by Follow Through and, later, by Head Start Planned Variation, several such early childhood models have been developed. Examples are behavioristic models such as Bushell's token economy and the Engelmann-Becker systematic behavioral principles program, Piagetian models such as Weikart's cognitively oriented curriculum, and open education models such as the approaches developed at the University of North Dakota and the Education Development Center.

The most important characteristic of an educational model is that it is grounded in a philosophical or psychological theory or position which gives coherence to the goals and values, the curricular materials and the classroom procedures and interaction patterns of the actual program. Each of the models mentioned above began with a philosophical or psychological theory or position from which objectives, curricula, materials and procedures were developed. When these models, their materials, their classroom operation and their objectives are examined, a marked within-model consistency and coherence is apparent. For example, Bushell's token economy classroom is built on the behavioristic principle of contingent and timely reinforcement of behavior segments. Both the contingent reinforcement and the behavior are clearly identifiable by teacher and student. High scores on academic achievement tests constitute the primary model goals; materials selected or developed by Bushell possess clearly specified objectives and are programmed to achieve these objectives; and the results obtained — superior scores on achievement tests — are consistent with the objectives, with the materials and with the procedures.

This consistency across the various aspects of the model stands in sharp contrast with the eclectic approach of many early childhood programs, exemplified in the statement, "I don't think there is any one best method. I select the best from what each approach has to offer." On the surface, this statement sounds reasonable and open-minded. The person seems to suggest that he has carefully studied Rogers, Piaget, Skinner and others or that he has examined models derived from such theoretical positions. He implies further that he has thoughtfully selected or derived procedures and materials from various models and has put them together to constitute a program superior to any of those from which he has borrowed. Actually, such trans-theoretical selection may be simply an excuse for not fully mastering any single model, let alone a variety of ideas and models. Furthermore, the practice will likely lead to confusion of goals and to less effective instruction. By taking a piece from this model and a bit from that one the educator assumes that instructional models are analogous to extremely simple mechanical models, and that if the various parts are selected carefully, they can be assembled into a neatly fitting, perfectly operating unit. But an instructional model is much more complex than even a sophisticated mechanical model such as an automobile, in which parts are not interchangeable across models. The bits and pieces from different instructional models, derived as they are from varying philosophies, will not necessarily operate effectively when put together. Indeed, a material or a procedure ideally adapted to one model may be so foreign to a basic value of another model that its use in the second model will prove counterproductive.

TO FACILITATE an examination of some of the advantages of educational models as well as some of the conflicts which could arise when parts of different models are combined in an eclectic potpourri, a simplified set of data has been prepared, shown in the

accompanying table. Two distinct early childhood models are described in terms of a restricted set of characteristics: a behavioristic, token economy model, in which children receive tokens, redeemable in goods or activities, in return for appropriate performance; and a child development model, in which children work on group and individual projects, circulate among interest centers and sit at desks or tables which are rearranged in response to educational demands.

If conducted well, each model can produce superior results on at least some dimensions, as demonstrated by its success with children. If poorly implemented, each can prove disastrous. But neither the absolute nor the relative success of the models is at issue. At issue is what can happen when models are mixed.

Characteristics selected to describe each model are (1) some of the process and product values which seem inherent in the model as it is described and implemented, (2) some key procedures used in model classrooms and (3) some of the teaching/learning materials employed. "Values" refers to those process or product characteristics to which the model developers and implementers explicitly or implicitly attach importance. Values constitute the fundamental element of an educational model, from which all else derives.

Although behaviorism is advertised as a value-free system, certain values emerge from an examination of behaviorist literature and token economy classrooms. They are (1) achievement on various school measures, (2) conformity in classroom behavior, (3) convergent thinking or the ability to respond in predetermined ways, (4) an authority figure (teacher, computer, etc.) who controls what takes place in the classroom, (5) efficiency in the teaching/learning process, and (6) teacher-child interaction via contingent reinforcement.

Of these six values, only efficiency and contingent reinforcement are inherent in the science of behaviorism, although in almost every example of applied behaviorism there is a power figure who establishes goals and rewards and dispenses rewards when behavior meets desired standards. (Indeed, only in more recent behaviorist literature has the establishment of self-reinforcement systems become prominent. The early writers from Pavlov to Skinner seem to assume an outside power figure.)

The assumption of an outside authority figure also suggests a drive toward convergent thinking and a certain degree of conformity in behavior. In practice, these two values — convergent thinking and conformity — receive a great deal of emphasis, although some research demonstrates that divergent thinking also can be induced through application of behavioral principles. The only value which is neither inherent in behaviorism nor logically derived from it is academic achievement. Achievement has value to behaviorists because it is valued by the public and by most educators.

SOME IMPORTANT CHARACTERISTICS OF TWO MODELS FOR EARLY CHILDHOOD EDUCATION

	BEHAVIORISM: TOKEN ECONOMY	**CHILD DEVELOPMENT**
Values	Academic achievement	Development of the "whole child," including academic achievement
	Conformity in behavior	Conformity *and* diversity in behavior
	Convergent thinking	Convergent *and* divergent thinking
	Power in the teacher	Power in the teacher, *and* Development of power in the child
	Efficiency	Belongingness
	Teacher-child interaction via contingent reinforcement	Teacher-child *and* child-child interaction
Procedures	Small group and individual instruction	Small group and individual instruction
	Individual, linear	Individual linear and non-linear assignments
	Seatwork, with teacher monitoring of performance, all activities teacher initiated	Small group and individual project work — either teacher or child initiated
	Frequent use of positive reinforcers on contingent basis	Spontaneous, irregular social reinforcement
	Grades explicit and related to achievement	Parent-teacher conferences instead of grades
		Field trips with informal activities and lengthy unstructured reports
Teaching/ Learning Materials	Programmed materials in traditional areas of reading, arithmetic, spelling, handwriting (workbooks, texts, worksheets)	Manipulative materials Books Experimental materials
	Basal readers	Natural materials Films Tape recorders Typewriters Construction supplies

The values of the child development approach have a fundamentally different source and a more complex character. They are derived from developmental educational theories. Developmental values are more complex, first, because they are bi-polar. For example, *both* conformity and diversity and *both* convergent thinking and divergent thinking are valued. Secondly, the child developmentalist may define his values differently. In a traditional early elementary classroom, for example, conformity might mean sitting quietly in one's desk or speaking only when the raised hand is acknowledged. In a child development classroom, conformity could mean voluntarily taking turns in a popular interest center or not disturbing others when going unsupervised to the restroom. While conformity is valued in both, the nature of the conforming act differs. (Incidentally, the combination of valuing both poles of many educational continua and defining some key terms differently from other educators has led to serious confusion when child developmentalists describe their position to others.)

Differences in values have directly and indirectly engendered most of the controversy which has surrounded and almost engulfed early childhood education in recent years. Variations in procedures and materials have also contributed to the controversy but they ultimately derive from values. Sometimes those responsible for local program development err by focusing on procedures and materials rather than on the explicit values to which they are inextricably tied.

The table shows a natural vertical flow from values to procedures and materials. For example, a system which values academic achievement relies heavily on books and workbooks as well as on activities structured to reinforce these materials. If the system values conformity, teacher monitoring is important. If it values convergent thinking, standard assignments in programmed materials and common texts are appropriate. If the system values diversity in behavior, nonlinear assignments and child-initiated activities are appropriate. Thus, consistency within models is reflected in the goals and in the procedures and materials selected to achieve the goals.

CROSS-COLUMN analysis of the table reveals some potential dangers inherent in selecting bits and pieces from different models. For example, let us consider a second-grade teacher who uses a child development approach in her classroom. Five children are not learning to read as well as the teacher thinks they should. In her studies, the teacher becomes acquainted with programmed reading materials and starts using them with this group. For 45 minutes each day she changes the rules for these five children. During this period they go to a special reading area where they work with the programmed materials; they are not permitted to work in other centers nor to engage in other activities. But do they learn to read? Under the regime imposed by the teacher and the materials, do these children fairly rapidly catch up in reading, and are they soon able to return to their regular activities? Probably not, for if these children are having trouble learning to read in their regular program, it is unlikely that the simple introduction of programmed materials for a specified period of the day will have a major impact on their reading skills. Indeed, it is more likely that they will feel punished and frustrated at being removed from their normal activities and required to work with the highly systematized materials. Furthermore, it is unlikely that a teacher who is not behaviorally trained will use programmed materials correctly. And if this is so, then it is even less likely that she will use the behaviorally more complex reinforcement procedures properly, presenting prompt contingent reinforcers according to a planned schedule. The teacher who has only a brief introduction to behaviorism is likely to confuse such a system with the star-for-each-book-read approach to providing rewards.

While the general risks of eclecticism are apparent, it should be noted that there is a vast difference between informed and uninformed eclecticism. The teacher who has seriously studied alternative theoretical positions, who recognizes his own ability to use materials and procedures from several models effectively and who then assesses the ability of his students to adapt to conditions derived from varying philosophical positions, has a stronger case for taking an eclectic approach than does the teacher who is not so well informed. But to become a properly prepared eclectic is substantially more demanding than to become competent in the operation of a singular model. The well prepared eclectic must fully understand each model from which he draws, and he must also be able to visualize the effects when specific pieces are drawn from one model and merged with portions of other models.

THE MOST vital issue for a community to consider in the adoption or development of an educational program is whether the values of the community are met through that program. If community values can be achieved through a behavioral program, the individual teacher or school should be able to conduct such a program. If a child development program permits the school to achieve the community's educational objectives, adoption of such a program should be permissible. However, in each instance, the teacher or the school must be prepared to describe and to defend the approach selected. This task should be easier in the case of a model than an eclectic program because of the straight line in a model from values to materials and procedures and expected outcomes.

The consistency of models has implications, moreover, for the preparation of teachers. A teacher education program has an obligation to prepare prospective teachers to function within at least one model. This preparation should be complete, including everything from the philosophical/psychological position to its application. Once the prospective teacher has mastered one model, attention may be given to preparing him in a second model or in the adaptation or modification of the first model. If a large teacher-preparation institution wishes its overall program to reflect the diversity of trends in the field, it could properly support a variety of models. This would permit each student, working with his advisor, to select the model most nearly congruent with his personal philosophical position. The institution could then meet the needs of schools and communities desiring one or another distinct model. In any event, each prospective teacher would be thoroughly grounded in at least one definitive instructional model. The alternatives would then be not only clear but accessible, making possible that plurality of educational choices for parents, students, teachers and communities that is now coming to be regarded, by professionals and laymen alike, as a prerogative of democratic citizenship. □

HANDS ON!

Computers and Early Learning

by Bernard Banet

A prediction: The factor that will change teaching and learning most by the end of the twentieth century will be the technology of microelectronics as applied to the design of computers and related information-processing devices. This prediction applies to the education of children in the preschool and elementary years as much as to any other group of learners.

MICROELECTRONICS is the miniaturization of electronic circuits into incredibly small sizes. Microelectronic technology already makes possible the mass production of the "guts" of a computer on a chip of silicon the size of a pinhead or an entire computer system on a wafer the size of a cookie. Computers needn't be big and expensive; they can now be tiny and cheap. Computers and electronic sensing and control devices will soon be embedded in every machine made; already they have appeared in vehicles, household appliances, office equipment, toys, games, industrial and agricultural machinery. Computers, as domesticated and common as the electric light bulb, will also be able to tie together existing communications, information, and entertainment systems and networks. Communications among people, transfer of information among machines, and communications between people and machines will be more rapid and efficient. Microelectronic components will integrate telephone, radio, television, post office, publishing, journalism, phonograph records, libraries, the film industry, sales and distribution of products, banking, credit systems—the list is endless. The impact of computer systems and related microelectronic devices on social, political, and economic institutions will clearly be one of the major themes of the rest of our lives. Schools and homes will be profoundly affected by these developments.

Already microelectronic technology has made possible the five-dollar hand calculator, the eight-dollar electronic watch (highly accurate), and the twenty-dollar videogame unit that permits families to "play" on their television screen. In 1977 the first "personal" computers selling for less than $1,000 appeared. The spring 1978 Montgomery Ward catalog prominently advertised an inexpensive microprocessor-based unit that uses a home color television as a display unit; the copywriters maintain that it will teach a variety of subjects to your children—all you need do is insert the appropriate cartridge. Calculator-like devices, preprogrammed to offer games and drills of basic arithmetic, are widely sold already. A "speaking" spelling tutor, hand-held and battery operated, has reached the shopping malls. Microprocessor-based versions of games such as Mastermind and Battleship were widely advertised for the December 1977 holiday gift-giving season. In October 1977, the U.S. House of Representatives' Science and Technology Subcommittee on Domestic and International Scientific Planning, Analysis, and Cooperation held hearings on "computers and the learning society" and heard of the enormous educational potential of the evolving computer technology.

By storing, retrieving, transforming, and transmitting information computers will incorporate, integrate, and transcend earlier technologies. But how can they become tools of everyday life, even tools used by very young children? Don't you have to know a computer language and use a computer terminal to talk to a computer? The answer is that as the costs of computer systems tumble, the barriers that impede man-machine communication are rapidly being eliminated. Not too long ago any form of direct interaction with a computer was very rare. Data were submitted in punchcard form and processed in "batch" mode. Interactive timesharing, with remote users communicating on-line via terminals to a central unit, is a great advance in itself. But the typewriter-like terminals that do most of the talking to computers are not the only means of communicating with a computer. Systems of the future, and prototypes available even at low cost today, can demonstrate communication via spoken language.

A touch on a display screen, the beam of a light pen, a musical instrument, a slight muscle movement, a change in temperature, a handwritten symbol, the movement of a "joystick" can also communicate to a computer. Computers can respond with letters

and numbers on a printer or screen; but they can also produce signals to control a satellite or traffic light or videotape player, or to turn off the oven when the roast is done. They can synthesize speech, music, or even realistic representations of three-dimensional landscapes and objects from patterns of 1's and 0's.

For many purposes it is not necessary to know a programming language in order to use a particular computer, any more than one must be able to write a script in order to watch a television show. For those who *do* want to master the computer as a creative tool, convenient and powerful programming languages are being developed for interactive uses. Because it is not necessary to read and type or know a programming language to communicate with computers, even the youngest child will be able to interact with them in some manner. Handicapped people will also find microcomputers of enormous value in a variety of special aids related to specific sensory and motor handicaps.

Replacing Paper, Not People

When one mentions computers-in-education to most educators, a concept of programmed instruction, delivered step by step through the computer, comes to mind. This is indeed the classic "computer assisted instruction" (CAI) style, intended to capture the active interchange of a patient and skilled human tutor with a student. In practice, person/machine dialogue usually falls far short of this ideal. CAI approaches to computer use utilize a behavioristic paradigm of teaching/learning modeled on the "shaping" process, in which the teacher (or experimenter) "reinforces" the student for making successive approximations to the *teacher's* final objectives. A careful task analysis of the final desired performance is used to design the sequence of instructional "frames." To a student, though, the carefully developed sequence can be tedious or frustrating. There is no magic that assures success in a step-by-step format any more than there is in the textbook format. CAI of the programmed variety remains a Teacher Initiates — Student Responds model.

Let us not, however, make the mistake of equating computer utilization in education with any single mode of learning, including the CAI format. Quite possibly, the initial experiments with computer-assisted instruction will be to all computer applications in education what programmed textbooks and workbooks are to the total universe of applications of *paper* in education! The computer will be such a ubiquitous tool that preparing students to master its many applications will probably become a major goal of education, just as students now must master the many uses of paper-based information systems: learning to read, write, type, and locate information in a library.

Tiny, cheap computers and related electronic devices, all "talking" to each other, will have more uses in education than paper-and-ink, blackboard and chalk. Every current use of paper in education will be enhanced by electronic systems. And since much of the paperwork of private industry and government has already been aided by computers, the proposition that inexpensive computer technology will produce the same changes in homes and schools should not appear radical.

What Computers Can Do

Why are computers already such a pervasive tool in almost every setting except home and school? To save money, certainly. But also because of the following capabilities of computer systems:

- *Accurate and rapid execution of repetitive or complex procedures* — mathematical computing of course, but also plotting curves, alphabetizing, searching lists, animating drawings, setting type, monitoring an industrial process.
- *Rapid and easy modification of a product*, e.g., a written document, musical composition, graphic drawing. By 1985, for example, your home portable typewriter, with computer-like innards, may permit you to insert, delete, reformat, change typefaces, address correspondence from a mailing list, justify both margins — just as office and publishing-industry computer systems already do.
- *Rapid updating of information* that can be shared across an entire network. (Consider what making airplane reservations would be like without an interactive computing network giving each ticket agent instant knowledge of the seat availability on hundreds of flights.)
- *Concurrent access to file entries*. Many people can consult a data bank without missing information because it is in use. Compare this to a paper file, such as offices have traditionally maintained, or a traditional library: Computer data are not checked out for weeks and they are not easily misfiled or misshelved.
- *Multiple categorization of file entries*. A document or other entry can be retrieved through searches on many different category "tags," in logical combinations, rather than on just one. The way card catalogs and indexes attempt to perform this multiple categorization task now is cumbersome by comparison.
- *Representation and analysis of processes and relations*. Computer-generated graphic displays add a dynamic component to static charts, tables, graphs, and diagrams. Computer models permit the users to study the consequences of changing parameters in a system, whether we are talking about finding the best way to reach the moon, build a car, control air pollution, deploy atomic submarines, or plan a menu.
- *Improvement of photographic and sound reproduction*. Digital storage will replace analog tape and record systems; computers are even being used to remove distortion from records made decades ago and to reduce the "noise" in photographs transmitted from Mars.
- *Replacement of systems requiring slower processing by providing immediate feedback to the user*. Voting machines connected to a central computer would obviate the need to wait for precinct returns, for example. In education, students can receive feedback on workbook exercises or exams much faster than if they had to wait for teacher feedback. This responsive feature is one of the hallmarks of computers in educational applications.

While computers will be tied together in information networks, each local computer will pack more and more processing and storage capacity into smaller and cheaper packages. Microcomputers the size of typewriters or portable television sets will be able to perform many tasks in "stand alone" mode. The problems that many educational institutions now have with time-sharing systems (slow response-time and unavailability of ports at peak use times) may well become bad memories of the computer's dinosaur era.

Rather than isolate people from

each other, computers can help people to communicate and do collective problem-solving. Computers facilitate collaborative efforts through computer "conferencing," a means of holding an ongoing discussion by entering items and responses into computer files. Such systems can be used by students, teachers, trainers, administrators, and parents. Students and teachers from all over the country could share ideas through a central computer file and communicate directly with other individuals through private message files.

As computer systems become more capable they will not only store activity files for classrooms or catalogs and indexes of available print and media information for libraries; they will eventually store millions of books and periodicals, films and television programs, for instant retrieval. Computers will be super-libraries, jukeboxes for accessing the archives of civilization — unlimited resources for learning and decision-making.

Computers as Learning Aids

Interactive games. From the viewpoint of this early-education specialist, the feature of computers and the mode of utilization that holds the most obvious promise for young children in the preschool and elementary years is the use of computers to present learning in gamelike situations with immediate feedback. High/Scope is in the first year of a long-term course of action designed to demonstrate multiple uses of electronic interactive systems in the kind of learning environment that we call "open framework." The High/Scope schools in Ypsilanti using the Cognitively Oriented Curriculum present a matrix within which to study computer utilization. In our preliminary investigations of the use of computer systems in our elementary classroom, it is the fascination with a pinball-like interactive system that stands out when one watches young children in front of a computer terminal — whether it is the University of Illinois' computer-based education system, PLATO, or the intermediate school district's timesharing system based on an H-P 2000 "minicomputer" or the Commodore PET (a microcomputer).

In our work with preschool and elementary children we are discovering that computer games can powerfully motivate the learning of basic skills and sophisticated concepts. If one builds into games an opportunity to increase skill systematically (such as by doing something faster each time) or to advance to a more complex or difficult task, it is not necessary to "manage" the student's progress by maintaining elaborate student records in the computer. Each student's file can be in his or her own head, with teachers and parents looking at printouts of the actual games the student has been playing to get an idea of the child's level of achievement. Rather than prescribe the child's learning experience, the computer can present an inviting menu from which the child can choose, freeing him or her from adults' limited ability to define optimal educational experiences for a particular student. Computer games can simultaneously incorporate fantasy elements, systematic feedback, and competition as well as foster teamwork, cooperation, and cross-age helping.

The power of interactive systems to attract users, including young children, to invite them to "play," and to give them feedback, approximates the sort of learning process that occurs when a child learns to talk, walk, play an instrument, ride a bicycle, perfect athletic skills. O.K. Moore impressively demonstrated the power of interactive systems to teach reading and writing skills to very young children over a decade ago, but the systems on which the "talking typewriter" were based were too expensive for widespread use. New technology changes the cost factor, and makes the systems even more fun to use.

Of course interactive systems can get boring, like any new toy. Variety and increasing challenge must be built into interactive computer-based activities, or they may become tedious. Apparently such electronic games as pinball and the Star Trek games played on timesharing systems are sufficiently challenging to become addictive to thousands of people, from high-school students to computer scientists. Surely elements of these successfully designed programs can be incorporated into electronic games for school and home use.

In computer games the computer can present the "board" on which the game occurs, or it can play the role of an opponent. Several people at different locations can play each other through a central computer. Games of chance, games of skill, instructional

games, classic board games, mathematical recreations are already available, though most of them have not been adapted for elementary-school children. High/Scope staff are beginning the process of modifying and inventing games that will stimulate learning of basic concepts and application of creative problem-solving techniques for children from preschool through sixth grade.

Tutorial systems. More ambitious and complex than games, whole tutorial courses are of course possible on interactive computer systems. To avoid the "brick wall" phenomenon of trapping the student in a sequence of steps, features can be built in that give the student the option of proceeding in certain directions rather than leaving the "flow" entirely to the determination of the course author and the computer. Students in curricula already developed for systems such as PLATO and TICCIT can choose to explore reference materials, request more information about the organization of a particular discipline or domain (a "map"), request a review, a quiz, examples, easier or more difficult material, and so forth. Tutorial programs incorporated into the home or in open classrooms could permit children to master skills (such as reading music or speaking a foreign language) when they choose to do so rather than as part of a group progressing toward the same goals. A challenge to curriculum developers in early education is to relate tutorials to the concrete experiences of the child.

Drill and practice systems. One major reason for the widespread resistance to "open" educational envi-

ronments that invite student initiative and do not prescribe specific learning experiences for most of the day is that they often appear to leave mastery of basic skills to chance. Teachers in such classrooms are often overwhelmed with logistical problems as they try to interact with diverse groups of learners on an individualized basis. Electronic systems offer an ideal method of giving students interesting and challenging opportunities to consolidate skills and concepts they have acquired through concrete and active learning. Examples are practicing reading skills and mathematical algorithms, learning vocabulary in a foreign language, memorizing the multiplication table. The rote information and the number of "overlearned" skills that we expect children to master in elementary school is quite finite. Surely these basic skills and concepts will be easily mastered in the future through electronic systems, perhaps even mostly at home, leaving schools to provide much more stimulating "concrete" experiences.

The elementary-grades math and reading drills developed by Patrick Suppes and distributed by the Computer Curriculum Corporation provide an example of a first generation of computer-managed drill and practice materials. Future materials for elementary students will probably be more gamelike, more like the ingenious math games developed by the Urbana PLATO group, and they will be delivered on units more like the PET microcomputer, with its low-cost graphics, or the pocket calculator drill/practice devices such as the Texas Instruments' Dataman.

Representing complex processes. Computers, even for elementary students, will provide a means for representing complex processes in order to help students discover relationships and isolate variables. Modes of representing processes include building and revising mathematical models, writing computer programs, planning a sequence of steps involved in any classroom project, simulating physical and social systems, analyzing data quantitatively. Students at the High/Scope School are fascinated by simulated journeys across the Oregon Trail (a program developed by the Minnesota Educational Computing Consortium). They are getting a sense of some simple economic principles by operating a computer-simulated lemonade stand (also an MECC program), and are even able to experience vicariously the process of making a soft landing on the moon while conserving a limited amount of fuel.

Not surprisingly, most of the simulations developed for school computers are designed, at this point, for use by students of high-school age or older (e.g., Ludwig Braun's Huntington simulations of physical and ecological and social systems). Given computer systems that can represent processes graphically and in "real time" rather than with successive printouts, it is just a matter of time before young children can experience systematically the operations of universes not directly accessible in the nonelectronic school environment. Seymour Papert at MIT has developed a programming language, LOGO, and a set of such universes, "Mathland," that permit children to learn the languages of geometry and algebra as well as the logic of computer programming during the elementary-school years; these concepts are learned as children attempt to move a "turtle" across a plane using mathematical expressions. Learning to program a computer is in itself an exercise in logic and problem-solving, analysis and synthesis.

A tool for creative activity. Some of the most impressive work with computers and young children has been done from the perspective of making the computer into a tool for creative activity rather than a presenter of questions and answers. Alan Kay and Adele Goldberg at the Xerox Palo Alto Research Center have perhaps taken this approach the furthest, as described in Kay's September 1977 article in Scientific American. The Xerox group has shown that junior-high-school children can compose music, create animated cartoons, and write stories, given a powerful programming language such as their SMALLTALK language, and a computer oriented to color animations, music, and text. Already preschool children are "doodling" electronically in color on their home TV sets on devices such as Fairchild's videogame unit. Music synthesizers have become inexpensive additions to home computer systems, musical devices useful for active exploration by young children of the principles of music theory and notation. The ability to edit a computer-composed product makes the computer an ideal medium for playfully creating, revising, and reshaping anything, as one would play with playdough. The work of Kay and Goldberg suggests the scope of what is possible. Electronic lego blocks, i.e., computer-screen representations of three-dimensional objects and environments built up from basic geometric shapes, are being used by engineers and artists. Young children will have access to such systems, too, and new creative energies will be unleashed.

Student assessment. Assessment of student progress and goals can be accomplished in open educational environments by interactive computer systems. Student writing, for example, can be entered into the computer files and analyzed for dimensions such as are already incorporated in, and computer-scored by, the High/Scope Productive Language Assessment Tasks (PLAT). Computers will be used to construct self-assessment quizzes for elementary-school students, just as item pools are sampled by computers at the university level now. The advantage of constructing quizzes and tests from large item pools is that it prevents the evaluation procedure from dangerously narrowing the curriculum to only those items that will be on the exam.

Since computers can keep track of student responses and modes of computer utilization, they can be enormously useful as research and evaluation tools. Learning activities that have computer-based elements may be easier to improve systematically than activities in which both processes and outcomes are less well documented.

Three Views of the Near Future

Will these various uses of computer systems change the learning and teaching process as we know it? What are the implications for families, for schools, for teachers, for students? Here are three contrasting views:

A golden age of learning. Home and school learning, according to this view of the future, will be revolutionized by the many uses of computer systems. Teachers will become liberated from uncreative tasks such as repetitious lectures and recitations, correcting tests, grading, checking workbook and homework assignments. Teachers will welcome computers as indispensable tools of their trade, just as farmers have come to regard tractors. Students, stimulated by the power of interactive electronic systems, will master basic skills easily and joyfully. Interactive electronic systems

will invite students to explore many domains of human knowledge and endeavor. Because of their interactive nature, electronic systems based on microelectronic components will advance the cause of progressive education in the Dewey and Piaget traditions, rather than remain the tools of those, often of behavioristic orientation, who believe that the ideal learning environment has goals explicitly stated by the instructor and not by the student. The individualization of learning goals, content, and methods made possible by computers will make the flexibility inherent in "open" alternative learning settings more attractive to teachers, parents, and students than at present. The widespread availability of "basic skills" programs and other educational software for home computer systems will redefine the public's expectations of school learning.

Optimists see computers-on-chips making it possible through mass education for most students to achieve broad competence actively and in a developmentally appropriate manner. Inquiry, problem-solving skills, and representation will be integrated with concrete experiences via the computer. Diverse student interests, abilities, and goals will be supported. The computer will become an equalizer, in the sense that it will give previously disadvantaged youngsters access to a wide range of skills and information, plus the motivational elements (i.e., computers give immediate feedback, are nonthreatening, fun, challenging but not frustrating) to use these resources. Lifelong learning will become a reality for millions through the combination of print and video media with an interactive component which can be accessed at home as easily as anywhere else in a community or the country.

Learning that stresses student initiative and breadth of experience will blossom, because the logistical problems confronting teachers with large classes will be solved through increased use of interactive electronic systems. One version of the golden-age scenario sees schools as institutions so substantially altered in their function by new technologies that they are ultimately transformed into learning centers operating more like libraries or museums than classrooms. *All* students will have access to tools and learning aids of all kinds, much as they do in the open-classroom environments of today.

An age of dehumanization. Perhaps a unified information/education/communications network is merely the final step toward a nightmare world of thought control. At the very least, pessimists suggest, computers will do for thinking what the automobile did for walking and television did for reading. Perhaps schools will undergo great strife over the issue of "capital intensive" vs. "labor intensive" techniques and will come to repeat the sad history of American passenger railroads, in which fights over job security and technological innovation distracted attention from the fact that the entire system was dying because of its inability to change.

Will schools become capital intensive, and will classrooms be replaced by cubicles in which students interact only with machines? Are we sure that technology will support humanistic values when so often it seems to undermine them? Will computers be used in place of experience with real people, places, and materials? Television sets in homes and textbooks and "seatwork" in schools have already replaced many real, direct experiences. Will computers exacerbate this trend? Will drill-and-practice and programmed CAI become the dominant formats, rather than the more open-ended applications of interactive electronic systems? Will learners be trapped in step-by-step strands, blocks, and levels, unable to pursue their own paths to their own objectives?

Instead of becoming an equalizer of class differences, electronic systems, say the pessimists, will widen class and caste barriers by giving children of affluent families access to learning resources that others cannot afford. Will children who have access to computers from the time they can sit up become a computer priesthood, leaving the computer illiterates doomed to low-prestige roles in society?

Business as usual. In addition to the optimists and pessimists, one comes across many educators who simply do not believe that interactive microelectronic systems will change teaching and learning significantly one way or another. They point out that computer technology and telecommunications have been around for years. Radio, television, and computers themselves have been a fact of life for North Americans for quite a while, but so far they have brought about neither a golden age nor a 1984/Brave New

World-style dystopia. Just because a new technology *could* be used to change the way people learn doesn't mean that it *will* be directly employed by the educational establishment in imaginative ways. Television is the prime case in point.

Schools as institutions have been remarkably impervious to technological change. Transportation and communications technologies have certainly affected schools, but only indirectly, through changes in people and communities rather than in the nature of classroom instruction. Even some individuals deeply involved in "instructional" computing believe that the computer's only function in schools is to teach children to use existing computer languages and to perform mathematical calculations. In their view, computers are too expensive and "technical" for young children to employ, except perhaps for drill-and-practice exercises.

Individuals working in the computer industry often point out that corporations and individuals with the talent and resources to produce software for educational applications will find other markets more profitable than schools. Commercial television's lack of educationally oriented programming is cited as evidence that the home market, also, is interested in entertainment rather than learning. Given instantaneous access to any page in any book in the Library of Congress, or access to any college course in the country, will the average citizen prefer to watch Celebrity Bionic Football on television? Will computers married to video-disc simply permit seven-year-olds to instantly retrieve works from the "I Love Lucy" corpus?

In the 1960's several large corporations lost money trying to market educational technology products; they may be reluctant to re-enter this market. Are the costs of computer-based systems now so much less that the wave of first attempts can now bear fruit, or are there problems more fundamental than economic ones? Certainly the home or personal microcomputer of today will not instantly usher in the millennium. For one thing, the microcomputer industry has major hardware and software compatibility problems—on the order of the lack of standardization that has made quadraphonic sound such a dud. It is possible that no one will buy the hardware because of lack of applications software, and conversely no applications software will be produced because the market is too fragmented among owners of different machines speaking different computer languages and accepting different kinds of input/output devices and storage media.

Shaping the Future

Given both optimistic and pessimistic predictions about the impact of microelectronic technologies, as well as the prediction of negligible effects, how can those of us concerned with the education of young children come to terms with the potential of microelectronic systems? The assumption that makes most sense to us is that the potential of these systems is as great as those promising a golden age say it is, BUT we must very purposefully work toward utilization of that potential in education. Computers have been so little used in elementary-school and preschool settings that we must give high priority to extending development work and applying it outside of the laboratories where pioneering work in electronic learning systems is being done. And we need systematic evaluation and research into optimal characteristics of interactive systems for young children. For example, what are the optimal modes of utilization for different developmental levels? How can the computer be used to do the following: encourage cooperation among learners; increase home involvement in learning; improve mastery of basic skills in "open" classes; support student-initiated inquiry, active problem-solving, and decision-making; widen the scope of student experiences and improve the articulation between symbolic and concrete learning activities; and free teachers for creative and personal involvement in student learning?

The golden age of learning will not automatically arrive. We need good R & D work among groups seeking to marry computer systems and student-initiated learning. We need to evaluate the utilization of computer systems in learning settings other than school classrooms, settings such as homes and community computer-learning centers. We also need to establish information networks to keep each other informed about the computer applications being developed all over the country. These tasks highlight the course of action that High/Scope planners and developers will be taking in the months to come.

The High/Scope research and development program on computer systems in early learning will seek to complement other research and development efforts around the country. In our particular approach we plan to combine the following elements:

- Demonstration and development of computer applications that stimulate creativity and initiative in young children (preschool and elementary grades).
- Demonstration and exploration of multiple uses of computer systems in an "open framework" classroom environment and in a community "computer arcade."
- Integration of applications with an existing curriculum framework, the High/Scope Cognitively Oriented Curriculum.
- Use of inexpensive microcomputer-based systems where possible.
- Provision of information services to early education specialists and parents concerning computer applications.
- Cooperation with leading technical innovators and software systems developers around the country—concentrating the impact of diverse development efforts by demonstrating them in one place and by bringing leading computers-in-early-education groups into closer contact.
- Investigation of the ways in which parents and teachers as well as young children interact with computers.

Since we are still in the planning and exploration phase of a long-term plan, we very much welcome reader comments and suggestions, particularly as to ways in which we can cooperate with other schools and projects involved in computer applications. □

BIBLIOGRAPHY

Ahl, D. *Basic Computer Games: Microcomputer Edition*. Morristown, New Jersey: Creative Computing Press, 1978.

Ahl, D. What's wrong with the little red school house? In D. Ahl (Ed.), *The Best of Creative Computing* (Vol. 1). Morristown, New Jersey: Creative Computing Press, 1976.

Braun, L. Microcomputers: Magic for educators. *Personal Computing*, January 1978, pp. 30-40.

Brumbaugh, K. Minnesota: computers and elementary education. *Proceedings of the Sixth Annual Conference of the National Association of Users of Computer Applications to Learning*, 1977.

Dugdale, S., & Kibbey, D.D. *Elementary Mathematics with PLATO* (2nd ed.). University of Illinois, Urbana: Computer-based Education Research Laboratory, 1977.

Dwyer, T. The art of education: Blueprint for a renaissance. In D. Ahl (Ed.), *The Best of Creative Computing* (Vol. 2). Morristown, New Jersey: Creative Computing Press, 1977.

Feisenstein, L. Computer country: An electronic jungle gym for kids. *ROM*, December 1977, pp. 30-33.

Kay, A. Microelectronics and the personal computer. *Scientific American*, September 1977, *237* (3), 230-234.

Kay, A., & Goldberg, A. Personal dynamic media. *Computer*, 1977, *10* (3), 31-41.

Koetke, W. Supertoys: A new approach to learning mathematics. *The Mathematics Teacher*, December 1973.

Luehrmann, A. W. Should the computer teach the student, or vice-versa? In D. Ahl (Ed.), *The Best of Creative Computing* (Vol. 2). Morristown, New Jersey: Creative Computing Press, 1977.

Moore, O.K. The preschool child learns to read and write in the autotelic responsive environment. In Y. Brackbill & G.G. Thompson (Eds.), *Behavior in Infancy and Early Childhood*. New York: The Free Press, 1967.

Nelson, T. *Computer Lib/Dream Machines*. South Bend, Indiana: The Distributors. Author, 1974.

Nelson, T. *The Home Computer Revolution*. South Bend, Indiana: The Distributors. Author, 1977.

Noyce, R.N. Microelectronics. *Scientific American*, September 1977, *237* (3), 63-69.

Oberlino, P., et al. *Elementary Reading on PLATO IV*. University of Illinois, Urbana: Computer-based Education Research Laboratory, 1977.

Papert, Seymour. Teaching Children Thinking. Cambridge, Mass.: MIT Artificial Intelligence Laboratory, LOGO Memo No. 2, AI Memo No. 247, 1971.

Seidel, R.J., & Hunter, B.C. *Academic Computing Directory*. Alexandria, Virginia: Human Resources Research Organization, 1977.

Solomon, C. Lending a child to computer culture. Cambridge, Mass.: MIT Artificial Intelligence Laboratory, LOGO Memo No. 20, AI Memo 343, 1975.

Zinn, K. Computer-aided instruction. In Belzer, Holzmann and Kent (Eds.), Encyclopedia of Computer Science and Technology, (Vol. 1). Marcel Dekker, 1976.

Can the way mothers and young children act with one another make a difference in children's current and later learning? Child-care professionals vary widely in their answers to this question. This article describes and interprets the longitudinal research that underlies High/Scope's position: that the mother-child relationship both influences and is influenced by children's early learning. Each mother-child pair must be seen by professionals as a unique relationship between unique persons, each of whom influences the other. Our understanding of parent-child interaction, and of its impact on children's learning, is deepened to the degree that we acknowledge and respect this reciprocity.

Parent-Child Interaction and Children's Learning

by Ann S. Epstein & Judith Evans

> We have to get away from the influence of belief in bald single forces, whether they are thought of as intrinsically psychological or sociological... We have to analyze conditions by observations, which are as discriminating as they are extensive, until we discover specific interactions that are taking place, and learn to think in terms of interactions instead of force. We are led to search even for the conditions which have given the interacting factors the power they possess.
>
> —John Dewey
> *Freedom and Culture*

From 1968 to 1971 a group of mothers and their infants living in Ypsilanti, Michigan participated in a home visiting program, the Ypsilanti-Carnegie Infant Education Project. At the end of the project, when the children were about two years old, mothers were observed teaching their children a simple game, and children were tested to measure their cognitive and linguistic development. Five years later, when the children were seven years old, mothers and children were again observed in a teaching/learning situation, and children were given standardized tests, also focusing on cognitive and linguistic abilities, to measure their academic aptitude and achievement. The figure below shows the measures used with mothers and children, when they were administered, and which relationships were explored and found to be important. In this article we will describe those dimensions of mother-child interaction which we have found to have important relationships to children's performance on the various measures at ages two and seven. (An additional purpose of the research, evaluating the short- and long-term impact of the home visiting program, will not be reported here but is detailed in two other High/Scope publications.[1]

Research Philosophy

Two beliefs guided the development of our research measures and our interpretation of research results. First is that researchers must let the data tell them which patterns of family interaction are beneficial or harmful to the child, rather than prejudge what constitutes "effective parenting." Applied to our research, this belief means that the interaction styles we have termed "positive" or "negative" are not so labelled a priori but are empirically determined; that is, they were found to have positive or negative associations with the measures of children's learning.

The second belief guiding the research is that mothers' behavior and children's performance are reciprocal. In other words, rather than make only causal connections (i.e., "If the mother

[1]The initial program and its impact is described in Lambie, Bond & Weikart, *Home Teaching with Mothers and Infants*, Monographs of the High/Scope Educational Research Foundation, No. 2, 1974. Longitudinal results will be reported in a monograph by Epstein & Weikart to be published by the Foundation in 1979.

does X, then the child will do Y"), we should see both mother and child as continuously engaged in a process of mutual initiation and response. This belief, though earlier given theoretical and empirical support (e.g., Bell, 1968), is only belatedly receiving widespread attention in the literature on parent-child relations. Applied to the research described here, it requires that our observational tools look to the spontaneous and responsive behaviors of both mothers and children, and that our interpretations of significant correlations be phrased in terms which emphasize the two-way effects that mothers' behavior and children's manifest abilities have upon one another. Thus, in the figure below we picture relationships at age two or age seven with a double-headed arrow to indicate the bi-directionality of effects. (Although relationships from age two to age seven are logically seen in a single direction or timeline—i.e., one can't talk of behavior at age seven influencing behavior at age two—mother-child interactions when the child was two years old are related to measures of children's learning at age seven because of the continuous interaction of mother and child during the five-year interval.)

These two beliefs, empiricism in defining effective parenting and mutuality of influence between mother and child, should be kept in mind as the reader reviews our research.

Research Sample

The research results reported here are based on a total sample of 53 families, 39 of which were assessed when the child was age two and again when the child was age seven, and 14 of which were assessed only when the child was age two.[2] Families were evenly divided according to ethnic background and sex of child. All were identified as working-class. The average education for the mothers was 10.7 years, and the occupation of the head of household was generally classified as unskilled. All families lived in or near the city of Ypsilanti.

Research Instruments

Two measures developed by High/Scope staff were used to observe mothers and children interacting. The Verbal Interaction Record was used at age two; the Mutual Problem-Solving Task was used at age seven. While both measures use a relatively standardized situation to observe mother-child interactions, the pair were left free to "generate" their own behavioral style within the context of this situation.

The Verbal Interaction Record (VIR). Mothers were asked to first encourage their two-year-olds to talk and then to teach them a simple block game (a method pioneered by Hess & Shipman, 1967). These activities, lasting an average of 15 minutes, were audiotaped in the family's own home. Tapes were later transcribed and mothers' verbal behavior was coded to measure the total amount and content of their speech. Five major coding categories were used:

- "Expansions" were coded when the mother repeated and then elaborated upon something the child said.
- "Questions" were coded when the mother asked the child questions as a teaching strategy.
- "Imperatives" were coded when the mother gave orders to the child, i.e., told the child to do something.
- "Negative imperatives" were coded when the mother gave the child a negative order, i.e., told the child *not* to do something.
- "Negative declaratives" were coded when the mother gave a negative answer as a means of instructing or controlling the child.

The Mutual Problem-Solving Task (MPST). Mothers and children were observed baking cookies together at home when children were seven years old. Observers stressed that there were no "right" or "wrong" ways to behave, and that they were interested in learning about the variety of ways mothers and children approached this task. The MPST situation was standardized by providing families with a choice of illustrated recipes and all necessary, as well as optional, utensils and ingredients. Mothers and children generally completed the baking task (i.e., preparing the batter and placing the pan in the oven) in less than 30 minutes.

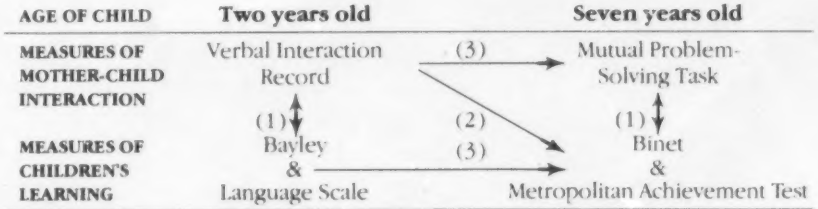
Four major coding groups, each with several categories, were used to code the ongoing behavior of mothers and children:

- "Affect" categories were positive and negative and were used to record such behaviors as smiling, laughing, frowning, scolding, etc.
- "Task involvement" categories permitted the observer to record whether the mother and child were working together, each was working alone, one was working while the other watched, or one was working while the other was not paying attention to the cookie-baking task.
- "Request" categories were used to record attempts to get assistance. Requests could be for help, direction, information, or evaluation and were further categorized as being verbal and/or physical.
- "Provide" categories were used to record attempts to *give* assistance. Parallel to requests, provisions could be help, direction, information, or evaluation. The quality of behavior was further categorized as verbal and/or physical, convergent or divergent, spontaneous or responsive, and supportive or restrictive.

Toddler measures. Two assessments administered at home were used with children at age two. The Language Scale developed by project staff indicated the amount and sophistication of children's verbal behavior during the same activities used to code the VIR for the mother. Cognitive development was measured with a standardized test, the Mental Scale of the Bayley Scales of Infant Development.

Childhood measures. Two standardized tests, both predictors of

MEASURES RELATING MOTHER-CHILD INTERACTION AND CHILDREN'S LEARNING



Note: Numbers in parentheses correspond to relationships reported in the section on research results.

[2]To evaluate program effectiveness, 14 families were added to the longitudinal study because it was felt that the regular assessments since infancy constituted a program "treatment" for the original control group, resulting in an underestimation of the program's effectiveness.

"Researchers must let the data tell them which patterns of family interaction are beneficial or harmful, rather than prejudge what constitutes effective parenting."

academic success, were given to children in school at age seven.[3] The Stanford-Binet Intelligence Scale measures school aptitude. The Metropolitan Achievement Test measures children's actual achievement in reading and mathematics.

Research Results

There were four major findings:

(1) At age two, and again at age seven, ways in which mothers and children interact during the observed teaching activities are significantly related to measures of children's learning. A positive interaction style at age two was found to be one in which mothers expand upon what the child is saying and ask the child questions as a teaching strategy during the block game; this style predicts high performance by children on learning measures. Negative interactions include giving "do's" and "don't's" and "no's" in response to the child's efforts and questions and predict lower performance on standardized tests.

At age seven, two interaction styles during the cookie-baking task were found to be positive. In the first, "teaching/learning," mothers and children share the activities. They talk a great deal, and their communication goes beyond that which is necessary to just complete the preparation of the cookie batter. There is mutual exchange of information, and mothers pose questions with the intention of encouraging children's independent problem-solving skills. The second positive style, "task efficiency," is also characterized by mothers and children working together on the task. The focus of their joint activity, however, is directed more toward the cookie-baking per se. Verbal exchanges are often accompanied by physical interactions. Children seek assistance and mothers provide this assistance while at the same time correcting children's mistakes in order to improve their performance. The one negative style at age seven is best described by the term "low interaction." In contrast to the shared activity of the two positive styles, the low interaction style is characterized by a passive child who either watches or is given one or two small tasks to do alone, while the mother works independently to complete the cookie-baking activity; interactions, verbal or physical, are at a minimum.

(2) Mother-child interaction styles at age two significantly predict children's academic success five years later. Specifically, when mothers and two-year-olds are observed to have positive verbal interactions, children perform well on school measures five years later. Conversely, negative verbal interactions at age two are associated with poor academic performance at age seven.

(3) Mother-child interaction styles at age two are only somewhat predictive of interaction styles at age seven. Children's linguistic development at age two, however, is highly predictive of their academic success five years later. Specifically, negative interaction styles appear to be quite stable over time. Positive interactions at age two, while not becoming negative with time, do not maintain comparable intensities five years later. Put retrospectively, the antecedents of negative interactions at age seven can be found at least as early as age two; the antecedents of positive interactions are less clear.

Children's linguistic development, observed in the interaction activity at age two, is strongly correlated with their academic aptitude and achievement at the end of first grade. The greater the quantity and sophistication of language at the earlier age, the better the child's performance five years later.

(4) At both ages, two and seven, interaction style is a more crucial correlate of children's learning abilities than is socioeconomic status. Interaction style, rather than SES, has the strongest relation to children's cognitive, linguistic, and academic ability. While this is at least partly a statistical artifact (i.e., the relatively narrow SES range of the sample limits the possibility of finding a significant correlation with other variables), the interaction data also reveal

[3]High/Scope researchers have found "actual school success," i.e., regular grade and class placement as opposed to retention and special education programs, to be a crucial outcome in their other longitudinal studies of early childhood education programs. Since children in the infant follow-up study reported here were only in first grade, however, it was too early to use actual school success as a valid criterion; most special placement does not begin until children are in second or third grade.

"Mothers' behavior and children's performance are reciprocal. Both mother and child...

an important truth about family relationships. Contrary to stereotypes, working-class families cannot be characterized by any one interaction style. A wide range of mother-child behaviors is evident even in this relatively small sample. Furthermore, within this range, all families show at least some positive interactions, and a number of these supposedly "high risk" families (including some that had not received any program "treatment") in fact share a great deal of warm and stimulating parent-child activities.

What These Findings Mean

Our interpretation of these results is based upon the two beliefs stated earlier: the need for an empirically based definition of effective parenting, and the mutuality of influence between mothers and children. The research results define positive and negative interaction styles empirically by showing the positive or negative associations of interaction styles with measures of children's learning. Positive styles encompass a range of behaviors in which a child is an active participant in a learning situation and mothers use questioning as a teaching strategy to promote the development of their children's linguistic and problem-solving skills. Negative styles are characterized by restrictive interactions during toddlerhood (i.e., parental sanctions and prohibitions as children endeavor to learn) and by few interactions later in childhood (i.e., parental exclusion and passivity of the child in learning situations).

Because the child and the mother are partners in the interaction process, our measures emphasize mutuality by observing both of them in the block and baking activities. Reciprocity is also acknowledged in our interpretation of the data: Parent-child interaction styles must be seen as a *result* as well as a *cause* of children's learning. That is to say, a mother's perception of her child's competence, and thereby her style of interaction with the child, is likely to be influenced by the child's manifest abilities and attitudes.

While the interrelation of interaction style and children's performance can be observed at a single point in time, we must infer their mutual influence during the five-year interval from age two to age seven. This inference is best supported by the stability of negative interaction styles over time together with poorer child performance at both ages. It is possible to develop a picture of a circular and unproductive relationship in which restrictive interactions and the child's limited competence result in further limitations on both the parent-child relationship and the child's level of learning.

The inference of a continuous reciprocity between parent-child relationships and children's learning is more difficult to support with regard to positive behavior. While our data show that positive interactions at age two did predict better performance at age seven, we did not simultaneously observe these same families in correspondingly high levels of positive interaction at this later age. This finding, however, may indicate not a decrease in such beneficial interactions but only a change in their nature which our later observation measure did not capture. A mother's expliiit emphasis on language is after all most appropriate during toddlerhood when her child is actually learning to talk. The verbal element in supportive interactions at age seven may become relatively implicit, particularly in a problem-solving situation requiring physical participation such as the baking activity. This interpretation means that an early focus on parent-child conversation can provide children with a necessary "head start" for learning (an interpretation supported by the findings of major researchers such as White et al., 1973), but this initial preparation must then be sustained by continued parent-child interactions appropriate to varied situations and consistent with the child's level of development. Such an interpretation implies that parents are "effective" teachers to the extent that they are aware of and sensitive to the developmental capacity which the child brings to the interaction setting.

Finally, that interaction style is more strongly related to children's emergent learning abilities than socioeconomic status needs to be emphasized, particularly in the conceptualization of parenting programs. Certainly the stresses of poverty may increase the likelihood that parents have less "energy" to devote to their interactions with their children, but SES by itself in no way dictates what the parent-child relationship will be in any given family. Any of a multitude of problems (e.g., divorce, extreme youth or age of

...are continuously engaged in a process of mutual initiation and response."

parents, family illness, a child's handicaps, moving to anew city) may contribute to difficulties in parent-child relationships. These difficulties, as well as individual ego strengths, cut across cultural background. The existence of nonsupportive family relationships, and the consequent need for assistance, must be empirically determined and not stereotypically assumed.

What do these findings and interpretations mean for the development of parent-infant intervention programs? One of the primary implications of the results is that they suggest an appropriate focus for such programs. The data indicate that it is inappropriate to focus *only* on infant development, as many infant-education programs did in the 1960's, just as it is inappropriate to make the mother the prime target; the appropriate focus is the mother-child interaction process. A second implication is that these programs should be available to families at all socioeconomic levels, since positive ad negative interaction styles are to be found within all socioeconomic situations. A third implication is that we now have an empirical definition of "effective parenting" — if "effectiveness" is seen to be reflected in a child's performance on developmental scales and achievement tests. The empirical definition of effective parenting encompasses a wide range of parenting styles. There is no prescribed style, but there *are* interaction characteristics which are positively correlated with cognitive/linguistic development and academic achievement.

Combined, these implications mean that parenting programs should be made available to all parent-child pairs whose style of interaction can be categorized as generally "negative," regardless of the socioeconomic status of the family. The proper focus for the program should be on strengthening whatever is positive in the parent-child interaction style. In general, the program should help the parents understand the ways in which their behavior generates a response in the infant, and the ways in which the infant, through temperament and behavior, generates a response in them. One of the primary purposes of working with parents, then, is to provide an atmosphere in which parents are able to observe their infant, interpret their own and the infant's behavior and responses, and seek ways to change negative patterns of interaction to positive ones.

Parents who are discouraged because their child is not as responsive as they would wish can be made aware of the fact that infants, even infants in the same family, differ from each other in disposition and temperament — with some children it is simply more difficult to get enthusiastic responses. Relatively inexpressive infants, however, needn't be "doomed" from the start if their parents learn to observe and appreciate the particular ways in which their children demonstrate their abilities and show unmistakable signs of growth and development.

Summary

The longitudinal research reported in this article identified a variety of positive dimensions of parent-child interaction, and a few negative styles, which effectively predict children's performance on standardized achievement tests and lead to an empirically derived definition of effective parenting. The findings suggest that an appropriate focus of parent-infant programs is the interactive process, and an appropriate goal of such programs is to provide support for the development of both parent and child. □

The home visiting program described in this article was supported through funds from the Carnegie Corporation of New York. Analysis of initial data was supported by a grant from the Spencer Foundation of Chicago, and follow-up data collection and analysis were conducted under a Carnegie Corporation grant.

REFERENCES

Bell, R. Q. A reinterpretation of the direction of effects in studies of socialization. *Psychological Review*, 1968, 75, 81-95.

Epstein, A. S. & Weikart, D. P. The longitudinal follow-up of the Ypsilanti-Carnegie Infant Education Project. *Monographs of the High/Scope Educational Research Foundation*, in preparation.

Hess, R. D. & Shipman, V. C. Cognitive elements in maternal behavior. In J. P. Hill (Ed.), *Minnesota Symposia on Child Psychology (Vol. 1)*. Minneapolis: University of Minnesota Press, 1967.

Kagan, J. The issue of stimulation in infant education. Paper presented at the International Symposium on the Ecology of Care and Education of Children Under Three. Berlin, 1977.

Lambie, D. Z., Bond, J. T. & Weikart, D. P. *Home teaching with mothers and infants. Monographs of the High/Scope Educational Research Foundation*, 1974, No. 2.

White, B., Watts, J. C., Barnett, I., Kaban, B., Marmor, J. & Shapiro, B. *Environments and experience: Major influences on the development of the young child*. Englewood Cliffs, N. J.: Prentice-Hall, 1973.

Reflections
High/Scope's Graduate Program

I
The Developmental Attitude

Watch a baby playing with her foot—this isn't just random behavior but an act of discovery. Observe a four-year-old boy handling a pair of scissors awkwardly—he may never have seen a pair of scissors before. Listen to a graduate student dispute, with great vehemence, some theoretical statement—he is simply trying to understand the statement in terms of his own experience.

Recognizing the broad pattern of development in the other person, the teacher tries to make sure that the person is taking the next step forward within that pattern. If the teacher sees that the person is taking that next step, he or she watches carefully, but doesn't intervene. It goes against the grain for most teachers to simply watch when they are supposed to be responsible for teaching. Yet in the interest of active, experiential learning, the teacher must sometimes watch and not act.

Of course, it also happens that the other person is not taking the next step forward. The teacher must come to have sensitive intuitions about where that next step lies and how to nudge tte other person, how to give the right kind of direction and guidance. It may be a new toy for a baby, a field trip for a group of children, a suggested research topic for a graduate student.

The developmental attitude requires careful attention to each individual. While there are recurrent patterns in development, these patterns have infinite individual variations, and one's application of a general principle of development to the understanding of an individual must always be done with great care.

II
Interpreted Experience

"Experience is the very atmosphere of the mind..."

—Henry James

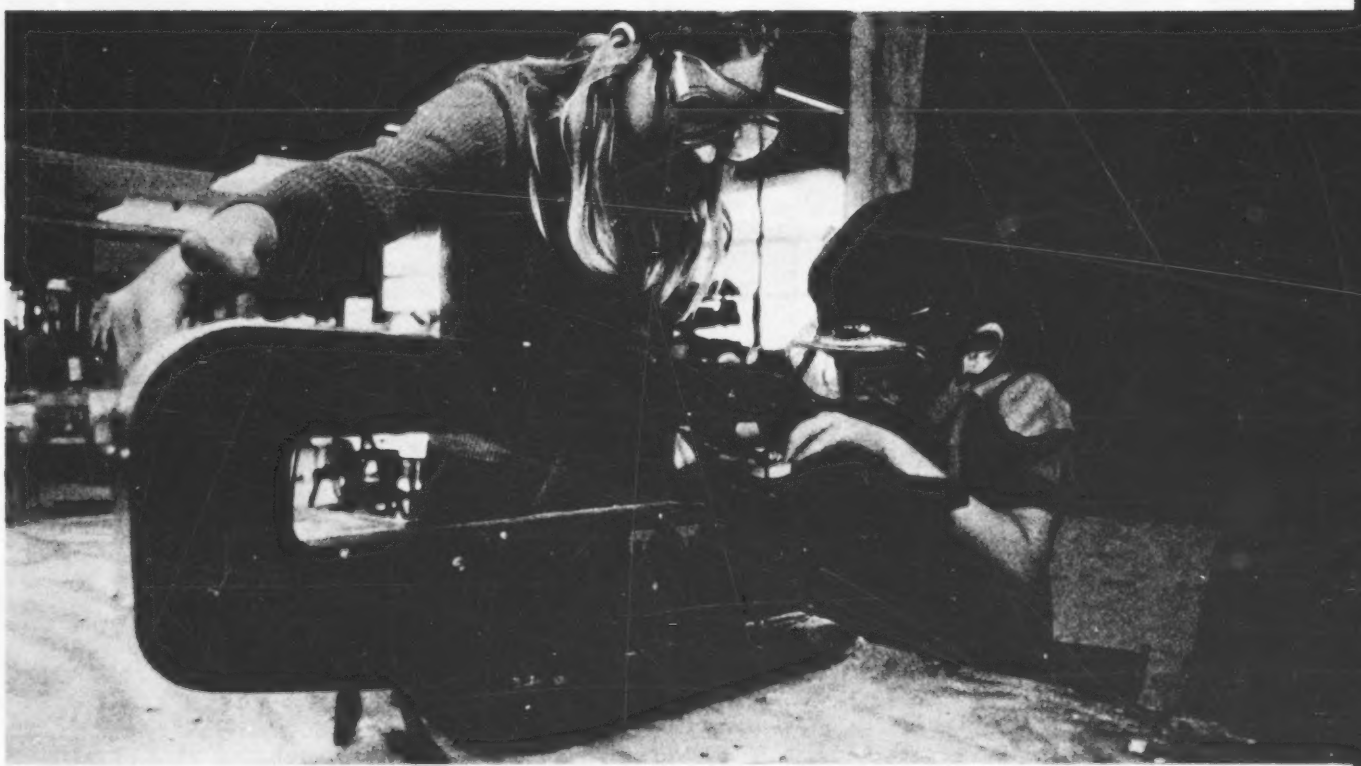
The graduate student at High/Scope encounters educational reality firsthand in practicum experience with children and parents and, through seminars, gains a conceptual framework with which to interpret and organize this experience. Practicums and seminars are the arena for the graduate student's adoption of a coherent approach to education within the context of his or her personal beliefs and values.

The heart of teacher education must be *interpreted experience* with children and parents. Without direct experience, talk about teaching is empty. Without interpretation, teaching can become ineffectual and unconnected with human development.

Interpreted experience is less efficient than words alone, and respect for an individual's development may slow a program down. Interpreted experience is less organized by its very nature than words alone can be, while the student teacher, struggling to get through the day, feels a need to know everything at once. But interpreted experience is how a graduate program can incorporate the developmental attitude and encourage students to achieve it. Interpreted experience begins with where a person is and moves on to the next step in the individual pattern of development. It is the guide in the search for meaning and purpose in education.

—Larry Schweinhart
Graduate Program Coordinator

47



THE HIGH SCOPE EDUCATIONAL RESEARCH FOUNDATION is an independent, nonprofit organization with headquarters in Ypsilanti, Michigan. The Foundation's principal goal is to develop and disseminate practical alternatives to the traditional ways of educating children and training teachers. Program grants from governmental and private sources support the Foundation's education and research projects. To further its goal of educational reform, the Foundation has developed the Cognitively Oriented Curriculum for infancy through the early adolescent years; operates demonstration schools for children ages three to thirteen and a summer workshop for teenagers; conducts professional conferences, workshops and seminars for the training of workers in the field of education; carries out evaluative research on educational programs; operates a graduate-level training program in education and human development; and produces audio-visual and print materials for educators, parents and others involved in the care and schooling of young children.

Current financial information on the High/Scope Foundation may be obtained by writing or calling the Administration Department.

Notes & News

As this issue of the **High/Scope Report** goes to press, we are celebrating the third anniversary of our move to the **HUTCHINSON HOUSE,** a historic Ypsilanti residence that is now also a center of educational research and development (see photos and story on page 26). An open house for the community drew 1500 visitors to the Hutchinson House in March 1978. In May more than 600 people visited the House as part of a Heritage Foundation tour of historic residences. The early childhood section of the World Education Fellowship, which held its international convention in Ypsilanti in 1978, also toured the facilities and learned about the Foundation's early childhood projects in the U.S. and abroad. ■ An exciting and productive academic year is in progress for the **HIGH/SCOPE GRADUATE PROGRAM IN EDUCATION & HUMAN DEVELOPMENT.** Graduate Program coordinators Sheila Mainwaring and Larry Schweinhart report that the students' undergraduate training and previous teaching experience is international in scope—from Dublin to Haifa to Queensland, Australia and back again to the Little Country Schoolhouse in Ypsilanti. In addition to seminars and practicums, students are at work on self-initiated projects, concentrating on such topics as bilingual and cross-cultural education, small-group activities in preschool and the relation of language to independent behavior. One student is doing a "Foxfire" project—taking children from High/Scope's Training & Development Center school into the community to learn about the culture of Ypsilanti directly from the people. ■ **May 23-25 1979** are the dates to keep in mind for the Foundation's annual **SPRING CONFERENCE,** which each year attracts educators from throughout the U.S. and Canada. The enthusiastic response of 1978's participants was most gratifying, and once again credit for this success goes to department directors and staff for their expertise, patience and good humor in making accessible some highly complex ideas. ■ The Parent-Infant department has received a three-year grant from the Bernard Van Leer Foundation to bring the **PARENT-TO-PARENT PROGRAM** to five communities in the U.S. Department director Judith Evans says the grant provides for the training of supervisory personnel and home visitors selected from the communities being served, which will become demonstration sites for the program. In the parent-to-parent approach, some of the parents initially visited become home visitors and trainers themselves; after a few "cycles" of home visiting and training, the local program is on its own—a self-sustaining community service in which parents learn from and support each other. Communities with ongoing parent-infant projects are invited to contact Dr. Evans for information on how to become a demonstration site in this program. ■ Parent-Infant and Research Department staff are gathering data on the nature of the child-development information needed by adolescent parents to rear their infants, in a project funded by the Administration for Children, Youth & Families of HEW. The **ADOLESCENT PARENTS AND INFANTS PROJECT,** directed by research associate Ann Epstein, is conducting pre- and post-natal interviews with young parents and developing formative evaluation procedures for use by programs serving young parents. ■ **ASSESSMENT OF THE LONG-TERM IMPACT OF EARLY EDUCATION PROGRAMS** on the lives of disadvantaged children is one of High/Scope's principal contributions to educational research and policy formation. Monographs published by the Foundation in 1978 documenting and interpreting the results to date of this longitudinal research have received international recognition and, as High/Scope president David P. Weikart points out in his comments on page 2, have helped to reopen the case for public pre-

$50

school education. Foundation researchers are continuing to follow the lives of young people who participated in the Perry Preschool and Curriculum Demonstration Projects in the early and mid-sixties. Research Department director John Love reports that within the next five years policy makers will have, for the first time, a comprehensive body of data on the long-term impact of compensatory preschool programs—data on employment, family and community life and citizenship as well as scholastic achievement. Supported by grants from the Carnegie Corporation of New York and the Administration for Children, Youth & Families, High/Scope researchers are analyzing data obtained through interviews, observations, teacher ratings and institutional records. Forthcoming monographs will address such critical issues as the long-term impact of early education on children's social adjustment, the long-term impact of home-visit programs on parents' attitudes towards childrearing and education (see the article beginning on page 39), and the environmental factors apart from schooling that influence children's development. ■ Another long-term study being conducted by the Foundation concerns the **IMPACT OF PL 94-142 ON HANDICAPPED CHILDREN AND THEIR FAMILIES.** This new five-year project is one of five such studies funded recently by the Bureau of Education for the Handicapped. The project director John Berrueta-Clement reports that longitudinal case studies will examine the educational, personal, social and economic consequences of federal and state law for a small number of Michigan children and their families that are present or former participants in the Foundation's BEH-funded First Chance Demonstration Preschool Project. ■ As a **NATIONAL FOLLOW THROUGH SPONSOR** High/Scope has worked with school systems since 1968 to provide a cognitively oriented alternative to the standard elementary curriculum. In recent years much attention has been given to the evaluation of these programs by High/Scope researchers and consultants. Elementary Education Department director Charles Hohmann reports that these evaluation activities are being documented for a research monograph to be published by the Foundation in 1979. High/Scope's efforts are adding new dimensions to the national Follow Through project's emphasis on standardized measures of achievement; classroom processes have been assessed through checklists and time-sampling observation systems, and children's ability to express their thoughts and feelings in writing is being studied. ■ High/Scope's efforts to produce better methods for **ASSESSING CHILDREN'S WRITING ABILITIES** have entered a new phase. With support from the Carnegie Corporation of New York, research associates Terry Bond, Bob Matz and Lynne Tamor are building upon previous work with the Productive Language Assessment Tasks (PLAT) to improve current assessment methods and achieve a more complete understanding of how children develop competence in writing (see the article beginning on page 19). As part of a research and development plan that spans several years, they are working with teachers and students in local public schools, where they'll get a direct look at how students are learning to write and how teachers are evaluating their work. ■ The general purpose of **PROJECT DEVELOPMENTAL CONTINUITY** is to provide continuity of experience for disadvantaged children as they progress from Head Start through the early elementary grades. High/Scope is conducting an evaluation of this national project at 12 sites across the country. Researchers are looking at program planning and implementation, costs, outcomes and structural changes resulting from the program. The final report of the Project Developmental Continuity feasibility study is now available, as are several interim reports; write or call Lynn Spencer, Research Department. ■ Project director John Love announces that a two-year study of the national network of **HOME START TRAINING CENTERS** has just been completed. These centers, funded by the Administration for Children, Youth & Families, provide training to Head Start and other child development programs that wish to offer home-based services. High/Scope's evaluation report describes the work of the training centers and summarizes data from surveys of people and programs that have received training. Contact Lynn Spencer, Research Department, for more information. ■ Michigan's Project CEDISS is studying how the products of research and development in **CAREER EDUCATION** can be disseminated and used, and High/Scope is providing a number of the evaluation functions for this NIE-supported work in one of the most rapidly expanding fields of education. Project director Art Granville reports that the Michigan Department of Education has funded 49 demonstration programs in career education statewide; High/Scope staff are in contact with all of these sites, collecting information through surveys, documenting their planning activities and assisting in the local evaluations. Case studies of six of the programs will be produced by the Foundation. ■ The **IMPACT OF THE MAJOR PROGRAM EVALUATIONS** conducted by the Foundation in recent years is appraised in papers presented by High/Scope research staff at the 1978 meeting of the American Educational Research Association. The papers are available from the Research Department as one document, titled "The Impact of Evaluation: Lessons Drawn from the Evaluations of Five Early Childhood Programs." ■ High/Scope has also been involved in **EVALUATING INTERNATIONAL PROGRAMS.** During 1978, research associate John Berrueta-Clement and Parent-Infant Department director Judith Evans, in cooperation with research agencies in Bolivia, Chile and Colombia, conducted an evaluation of the Inter-American Children's Institute for the Organization of American States. The Institute, located in Montevideo, Uruguay, promotes research, training and curriculum development for the children of Latin America. ■ International Programs director David Fisk reports that the work of the Foundation is receiving increasing attention in **LATIN AMERICA.** "Las Ultimas Noticias" of Santiago, for instance, ran a seven-page special report—"Revolution in the Preschool Classroom"—on Chilean educators' attempts to adapt High/Scope's Cognitively Oriented Curriculum to preschool classrooms throughout Chile. And the November-December 1977 issue of "Educacion Hoy," a professional journal published in Bogota, contained a translation of an article by David Weikart and Larry Schweinhart on the longitudinal findings of the Perry Preschool project, which orginally appeared in the High/Scope **Bulletin.** Reprints of these Spanish-language publications are available from the Foundation; contact Nancy Brussolo, Administration. ■ Another publication of significance coming out of High/Scope's Latin American efforts is a report on **PRESCHOOL EDUCATION AND PUBLIC POLICY IN LATIN AMERICA.** The report summarizes the results of a survey of early childhood programs in the Andean region; available in English and Spanish, it was prepared by staff member Robert Halpern in collaboration with private sector agencies in Bolivia, Chile and Colombia, under a USAID grant. Three Spanish-language companion volumes document the status of preschool education in each of these countries. For copies of the survey report or ordering information on the companion volumes, contact our International Programs office. ■ The Venezuelan Fundación del Niñō, a national child-welfare agency, has completed an evaluation of its **DAY**

CARE HOMES PROGRAM, with High/Scope technical assistance and partial support from UNICEF. Through a series of workshops in Caracas and Ypsilanti over a nine-month period, High/Scope staff supported a team from the Fundación in designing and implementing what is probably the most penetrating and comprehensive study of its kind in Latin America. The work of the evaluation team included interviews with over 1000 day care mothers, an ethnographic study of 15 day care homes and 15 other care settings in the "barrios" of Caracas as well as a study of program costs. A final report was submitted to the Fundación's Board of Directors, chaired by Venezuela's First Lady. ■ Back in the U.S., the number of preschool centers practicing cognitively oriented education continues to grow, reports Preschool Education Department director Michael Hanes. Each new site becomes part of a **REPLICATION NETWORK** that supports curriculum development and dissemination activities. Staff consultants are now implementing the recently developed bilingual curriculum with the Eastmont Center I Head Start program in Montebello, California, the Guadalupe Head Start program in Milwaukee and the McKinstry and Webster Head Start programs in Detroit—under a contract from the Administration for Children, Youth & Families. Selected preschool special-education programs in Rhode Island and Michigan are receiving training in High/Scope's Cognitively Oriented Curriculum under a grant from the Bureau of Education for the Handicapped. Consultants are also working with the public school systems of Milwaukee and Richmond, Virginia and with the New Jersey Department of Education. Preschool administrators are invited to contact the Preschool Education Department for information on the specific type of assistance that can be arranged for their programs. ■ And from our director of Planning & Development, Bernard Banet, comes this word about two joint ventures: "The U.S. Office of Education has funded a one-year **JOINT MODEL STUDY PROJECT** to be undertaken by High/Scope and the Behavior Analysis Follow Through group at the University of Kansas. The project will examine the feasibility of a hybrid educational approach using elements from the Behavior Analysis model and High/Scope's Cognitively Oriented Elementary Curriculum. The Behavior Analysis model emphasizes management of reward contingencies for completion of sequenced basic-skills learning activities. Can such an approach be combined in a productive way with High/Scope's emphasis on child initiation, curriculum breadth and skill application? Both groups feel that the potential of such a hybrid is well worth exploring. Our Office of Planning & Development is also working with Interact Electronics of Ann Arbor to develop a series of **LANGUAGE ARTS LEARNING ACTIVITIES** for Interact's home computer, the Interact One. The activities will include games and tutorials displayed through a home television set. The consumer-priced computer will be able to read stories to young children from an audio tape at the same time the written words of the story are displayed on the screen. The Interact system will also enable children to write and store written products, with the TV screen used as an electronic notebook. The series of activities will illustrate the potential of home computers to support four elements of a good language arts program: access to interesting reading material, opportunities to write one's own compositions, sequenced practice of skills and motivation through games to practice and apply skills." (See the article beginning on page 33.)

Young Children in Action

A Manual for Preschool Educators

ISBN 0-911114-05-5

by Mary Hohmann, Bernard Banet, & David P. Weikart

- Based on the Cognitively Oriented Preschool Curriculum, a tested and demonstrated program in use since 1962.
- Includes complete set of *Key Experiences for Cognitive and Social Development.*
- Over 100 photos of young children and adults in action together.
- Teaching strategies, activities, and checklists.
- Complete subject index; bibliographies for each chapter.
- Priced affordably at $10.00 (paper).

Please send _____ copies of *Young Children in Action* at $10.00 per copy (price includes postage and handling).

Payment or institutional P.O. must accompany order. Make check payable to the High/Scope Foundation.

Name _____

Address _____

City _____

State _____ Zip _____

High/Scope Foundation
Dept. AR
600 North River Street
Ypsilanti, MI 48197
(313) 485-2000

Contributors

Bernard Banet

Ann S. Epstein

Robert D. Matz

James T. Bond

Judith Evans

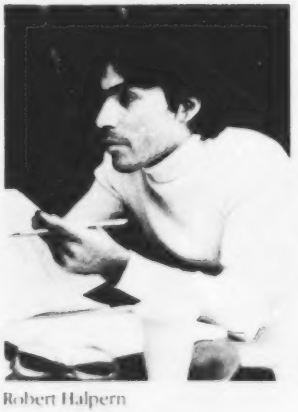
Larry Schweinhart

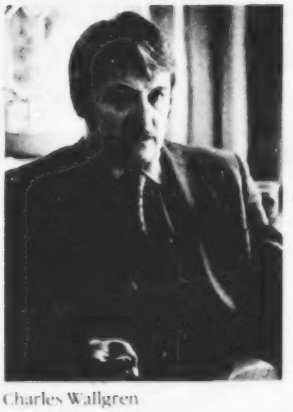
Margaret E. G. Brisch

William Fabricius

Lynne Tamor

Robert L. Egbert


Robert Halpern


Charles Wallgren

Bernard Banet *(Computers & Early Learning)*, Director of Planning & Development, High/Scope Foundation.

James T. Bond *(Formal Assessment of Children's Writing)*, Research Associate, High/Scope Foundation.

Margaret E. G. Brisch *(The Advantages of Educational Models)*, Assistant Professor of Early Childhood Education, University of Nebraska.

Robert L. Egbert *(The Advantages of Educational Models)*, Dean of the School of Education, University of Nebraska and Member of the Board, High/Scope Foundation.

Ann S. Epstein *(Parent-Child Interaction & Children's Learning)*, Research Associate, High/Scope Foundation.

Judith Evans *(Parent-Child Interaction & Children's Learning)*, Director, Parent-Infant Department, High/Scope Foundation.

William Fabricius *(Piaget's Theory of Knowledge: Its Philosophical Context)*, Consultant, Preschool Education Department, High/Scope Foundation.

Robert Halpern *(The Economics of Preschool Education)*, Research Associate, High/Scope Foundation.

Robert D. Matz *(Formal Assessment of Children's Writing)*, Research Associate, High/Scope Foundation.

Larry Schweinhart *(Reflections: High/Scope's Graduate Program)*, Coordinator, Graduate Program, High/Scope Foundation.

Lynne Tamor *(Formal Assessment of Children's Writing)*, Research Associate, High/Scope Foundation.

Charles Wallgren *(A Glimpse of High/Scope's Home)*, Director of Administration, High/Scope Foundation.

Announcing

HIGH/SCOPE ANNUAL CONFERENCE

Ann Arbor, Michigan's Campus Inn will be the site of the Foundation's Spring Conference on May 23-25, 1979. This three-day series of workshops and seminars on High/Scope's Cognitively Oriented Curriculum annually attracts participants from throughout the United States and Canada. Contact the Foundation's Administration Department for a conference brochure and registration information.

AUDIO-VISUAL MATERIALS

The audio-visual materials produced and distributed by High/Scope for training in parent-infant, preschool and elementary educaton are used by university and community college classes, state departments of education, Head Start and day care centers, inservice programs for elementary and preschool teachers, private consultants, high-school classes in child development, hospitals and libraries, among others. Write to the Administration Department for a catalog describing High/Scope films, filmstrips and videotapes, or to request the free loan of the introductory filmstrip about the Foundation, *Who We Are...What We Do*.

SUMMER WORKSHOP FOR TEENAGERS

Since 1963, High/Scope has operated an eight-week summer workshop for talented and gifted teenagers from throughout the United States and abroad. The workshop focuses on enabling these young people to use their talents in the arts and sciences actively and creatively. Through such program units as daily instructions, week-long clubs, work projects, nightly evening programs, special-interest workshops and pack trips, participants advance their capacity to think through an idea and act on it. The workshop creates a community which relies on each individual's contribution and his or her openness to the whole group. Teachers and parents report that the outcome of a summer based on this philosophy is young men and women better able to initiate activities on their own, more willing to ask questions about how and why things are as they are and more open to working collaboratively. Schools and national organizations in the U.S., Hawaii, England, Norway, Germany, Austria, Colombia, Peru, Chile and Australia regularly select young people for the High/Scope Summer Workshop, held each year at High/Scope Camp, Clinton, Michigan. Families from throughout the country interested in the program may enroll their youngsters by direct application.

WORKSHOP ON ADOLESCENT NONFORMAL EDUCATION

Date: August 12-15, 1979
Place: High/Scope Camp, Clinton, Michigan
For: Educators and parents of adolescents

Participants will explore education for adolescents in terms of the special needs of the talented and gifted and the social-development issues that play such an important part in the lives of teenagers. The expertise of the High/Scope Summer Workshop for Teenagers staff will be brought to bear on such topics as instruction in music, drama, science and writing; the uses and value of work for teenagers; and task-setting and problem-solving in small groups.

SCHOLARSHIP FUND

The High/Scope Board of Directors has authorized a scholarship fund to aid specially selected students attending the various High/Scope educational programs as well as adults participating in the graduate program. Contributions are accepted from individuals both inside and outside the Foundation. Contributors have the option of selecting where their contributions will go: the High/Scope preschool, elementary school, summer workshop for teenagers, or graduate program. Contributions for restoration of the Hutchinson House, the Foundation's headquarters, are also welcome. All contributions are tax deductible.

GRADUATE PROGRAM

THE HIGH/SCOPE GRADUATE PROGRAM IN EDUCATION & HUMAN DEVELOPMENT. If you hold a bachelor's degree in any discipline and are interested in career possibilities in innovative education, this nine-month graduate program utilizing a seminar and practicum approach for advanced training may be what you're looking for. As a High/Scope graduate student, you will

- Learn to apply developmental theory while teaching in our demonstration classrooms.
- Work individually in an informal setting with staff from our parent-infant, preschool and elementary education departments.
- Learn methods of classroom observation and evaluation.

There are M.A. degree possibilities with cooperating institutions. Send for catalog and application form for the academic year beginning September 1979.

SUMMER GRADUATE PROGRAM

High/Scope is offering a five-week graduate-level program for teachers, beginning June 25, 1979. Enrollment is open to qualified persons with a bachelor's degree in any discipline and at least one year of teaching experience. The intensive course of study centers on the theory and practice of a developmental approach to early childhood education.

TEACHER & TRAINER INSTITUTES

The High/Scope Preschool Education Department will hold **TEACHER INSTITUTES FOR EARLY CHILDHOOD EDUCATORS** on the following dates: **March 26-30, 1979** and **August 20-24, 1979.**

- Five days of intensive training at the Foundation's Preschool Demonstration Center in Ypsilanti, Michigan.
- Classroom observation and teaching, workshops on the Cognitively Oriented Curriculum, discussion of issues raised by participants.
- Enrollment limited to 10 participants per session.

A **TRAINER INSTITUTE** for curriculum specialists, supervisors and trainers in early childhood and special education will be held **April 23-27, 1979.**

- Learn to conduct workshops and inservice training, provide feedback to teachers based on classroom observation and promote parental involvement.
- Enrollment limited to 10 participants.